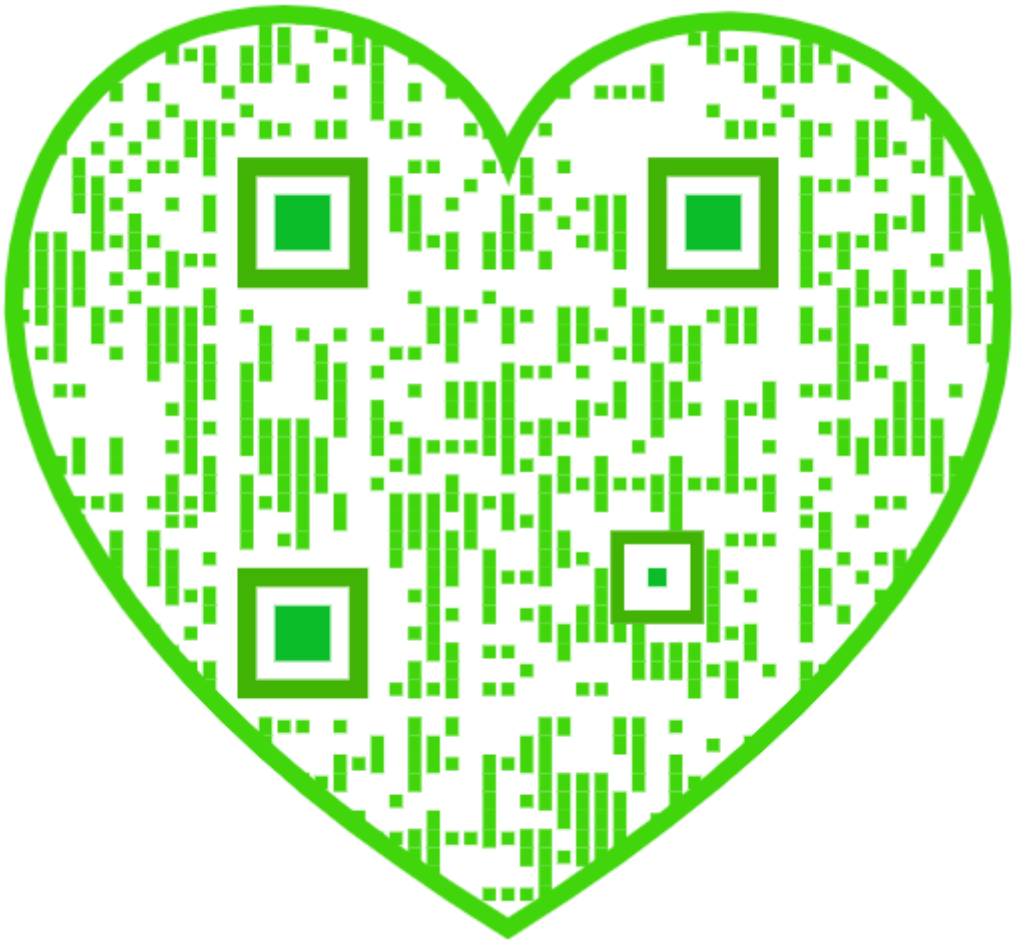
GV
1069
.H5
1929
Copy 2



PRICE 50 CENTS

HOW TO SPRINT

Edited by

ARCHIE HAHN

A. G. SPALDING & BROS.

MAINTAIN THEIR OWN HOUSES FOR DISTRIBUTING THE

SPALDING

COMPLETE LINE OF

ATHLETIC GOODS

IN FOLLOWING CITIES

EASTERN DIVISION

New York . 105 Nassau Street, 28 New Street, 518 Fifth Avenue
Hempstead, N. Y., 89 Main Street
Lake Placid, N. Y., Lake Placid Club
Albany, N. Y. . . 52 State Street
Buffalo, N. Y. 268 Main Street, 226 Franklin Street
Syracuse, 357 South Warren Street
Rochester, 40 Clinton Ave., North
Newark, N. J. . 589 Broad Street
Bridgeport, Conn., 248 Fairfield Ave.
Boston, Mass. . . 11 Otis Street
Philadelphia 113 South 16th Street, 222 North 15th Street
Pittsburgh, Pa., 608 Wood Street
Baltimore, 110 East Baltimore Street
Washington, 1338 G Street, N. W.
Atlanta . 74 Broad Street, N. W.
Jacksonville . 23 So. Hogan Street

WESTERN DIVISION

Chicago . 211 South State Street
Champaign, Ill., 612 East Green St.
Indianapolis, 136 N. Pennsylvania St.
Akron, O. . 36 South Howard St.
Cincinnati . 119 East Fifth Street
Cleveland . 1434 Euclid Avenue
Columbus . 197 South High Street
Dayton, O., Second and Main Sts.
Toledo, Ohio, 427 Superior Street
St. Louis, Mo. . 823 Locust Street
Kansas City, 918 Grand Avenue
Milwaukee, 407 East Water Street
Minneapolis, 52 Seventh St., South
St. Paul . 386 Minnesota Street
Detroit 533 Woodward Avenue
Louisville, 331 West Walnut Street
Oklahoma City, 320 N. Broadway
Memphis, 104 South Second Street
Denver, Col. . 1615 Welton Street
Dallas, Tex . 1518 Main Street
New Orleans, 130 Carondelet Street
Des Moines . 803 Locust Street
San Antonio . 206 Losoya Street
Houston, Tex 1215 Prairie Avenue
Omaha, Neb. 1618 Harney Street
Sioux City, Ia., 413½ Nebraska St.

PACIFIC DIVISION

San Francisco, 156-158 Geary Street
Los Angeles, 716 South Hill Street
Oakland, Cal. . 1751 Broadway
Del Monte, Cal., Hotel Del Monte
Portland . . . 187 Sixth Street
Seattle . . 1204 Second Avenue
Salt Lake City, 21 E. First South St.
San Diego, Cal. . 145 Broadway

London, England
[illegible] High Holborn, W. C. 1
[illegible] Cheapside, E. C. 2
Liverpool, England
22 Lord Street
Birmingham, England
[illegible] New Street
Bristol, England
42 High Street
Manchester, England
4 Oxford Street
Leeds, England
[illegible] King Edward St.
Brighton, England
99 St. James Street
Southsea, England
94 Palmerston Road
Edinburgh, Scotland
3 South Charlotte St.
(Cor. Princes Street)
Glasgow, Scotland
21 Jamaica Street
Belfast, Ireland
15 Lombard Street
Sydney, Australia
352 Kent Street
Paris, France
25-27, Rue Tronchet
Cannes, France
(Alpes Maritimes)
89, Rue d'Antibes
Brussels, Belgium
55, Rue de l'Arbre Benit
Vancouver, B. C.
424 Hastings St., W.
Johannesburg, So. Africa
3 Heath's Hotel Bldgs.
Von Brandis Street

Communications directed to A. G. Spalding & Bros., at any of the above addresses, will receive prompt attention

THE SPALDING

TRADE MARK, QUALITY AND SELLING POLICY CONSTITUTE
THE SOLID FOUNDATION OF THE SPALDING BUSINESS

SPALDING'S ATHLETIC LIBRARY

SPALDING OFFICIAL ANNUALS

		Approximate Date of Publication	
No. 100X.	SPALDING OFFICIAL BASE BALL GUIDE	March	35c.
No. 59B.	SPALDING LITTLE RED BOOK	February	50c.
No. 200X.	SPALDING OFFICIAL FOOT BALL GUIDE	July	35c.
No. 5R.	SPALDING INTERSCHOLASTIC FOOT BALL GUIDE	July	25c.
No. 108R.	SPALDING OFFICIAL INTERCOL. SOCCER GUIDE	October	25c.
No. 700X.	SPALDING OFFICIAL BASKET BALL GUIDE	October	35c.
No. 17R.	SPALDING OFFICIAL WOMEN'S BASKET BALL GUIDE	September	25c.
No. 57X.	SPALDING TENNIS ANNUAL	April	35c.
No. 91R.	SPALDING OFFICIAL INTERCOL. SWIMMING GUIDE	October	25c.
No. 3X.	SPALDING GOLF GUIDE	June	35c.
No. 38R.	SPALDING OFFICIAL FIELD HOCKEY GUIDE	September	25c.
No. 120R.	SPALDING OFFICIAL VOLLEY BALL RULES	Yearly	25c.
No. 113R.	SPALDING OFFICIAL LACROSSE GUIDE	Yearly	25c.
No. 1X.	SPALDING OFFICIAL ATHLETIC ALMANAC	January	35c.
No. 112R.	SPALDING OFFICIAL HANDBOOK NATIONAL COLL. A. A.	March	25c.
No. 115R.	SPALDING OFFICIAL HANDBOOK WOMEN'S ATHLETICS	Yearly	25c.
No. 117R.	SPALDING OFFICIAL ATHLETIC RULES (A.A.U.)	Yearly	25c.

Group I. Base Ball

No. 100X. Spalding Official Base Ball Guide. Major and minor league averages, annual reviews, world series, official playing rules, knotty problems, pictures of big league players and action scenes in world series and major league games. . . . **Price 35 cents**

No. 82X. Knotty Base Ball Problems. Price 35 cents

No. 59B. "The Little Red Book." Base Ball Best-on-Record (no league averages), including world series records. . **Price 50 cents**

No. 508B. Ready Reckoner of Base Ball Club Standings. . . . Price 50 Cents

Each of following numbers, 25 cents

No. 12R. Indoor Base Ball
No. 79R. How to Pitch
No. 80R. How to Bat
No. 81R. How to Umpire
No. 83R. How to Organize a League; Manage a Team; Captain a Team; Coach a Team; Score a Game; Arrange Signals; Lay Out a Diamond
No. 96R. How to Catch, How to Run Bases
No. 97R. How to Play the Infield and Outfield.

Group I.—Continued Base Ball

No. 202R. How to Play Base Ball (Including "Base Ball for Beginners")

Group II. Foot Ball

No. 200X. Official Foot Ball Guide . . . Price 35 Cents

Each of following numbers, 25 cents

No. 5R. Interscholastic Foot Ball Guide
No. 47R. How to Play Foot Ball
No. 108R. Official Intercollegiate Soccer Foot Ball Guide
No. 39R. How to Play Soccer (Including Official Playing Rules)
No. 116R. Women's Soccer Handbook

Group III. Tennis

No. 57X. Spalding Tennis Annual. The leading year-book of the game. Official playing rules, scores of national championships, Davis Cup and other events.
Price 35 Cents

No. 510B. Tennis for The Junior Player, The Club Player, and The Expert. By W. T. Tilden 2nd. **Price 50 Cents**

No. 511B. How to Build a Tennis Court. Price 50c.

The following number, 25 cents.

No. 34R. Tennis Errors and Remedies

Specially Bound Series of Athletic Handbooks

Any 50 cent book will be bound in flexible or stiff cover for $1.00; any 35 cent book will be bound in flexible or stiff cover for 85 cents; any 25 cent book will be bound in flexible or stiff cover for 75 cents; or any two 10 cent books in one volume for 75 cents. One 25 cent book or two 10 cent books will be bound in imitation leather in one volume for $1.00. One 35 cent book will be bound in imitation leather for $1.25. One 50 cent book will be bound in imitation leather for $1.50. Mention style of binding preferred.

(Continued on next page. Prices subject to change without notice.)

Printed in U. S. A.

SPALDING'S ATHLETIC LIBRARY

Group IV. Golf

No. 3X. Spalding Golf Guide.
The popular annual of the game. Records of leading events, pictures of champions; with special rules section in vest pocket size.
Price 35 cents

Each of following numbers, 25 cents

No. 4R. How to Play Golf
No. 63R. Golf for Girls. (Cecil Leitch)

Group V. Basket Ball

No. 700X. Official Basket Ball Guide . Price 35 Cents

The following number, 25 cents

No. 17R. Official Women's Basket Ball Guide

Group VI. Skating and Winter Sports

Each of following numbers, 25 cents

No. 8R. The Art of Skating
No. 72R. Figure Skating for Women
No. 90R. Ice Hockey Rules (Including Rules for Speed Skating and Curling)

Group VII. Track and Field Athletics

No. 1X. Spalding Athletic Almanac. Olympic, world and A.A.U. records; pictures of world record holders. Olympic and national champions; with supplement containing rules for conducting a track meet. . . . . **Price 35 cents**

Each of following numbers, 25 cents

No. 45R. Intercollegiate A.A.A.A. Official Handbook
No. 94R. Olympic Games of 1920
No. 112R. National Collegiate A.A. Official Handbook
No. 69R. Athletics for Girls
No. 115R. Official Handbook **National** Committee on Women's Athletics of American Physical Education Association—Including Official Rules for Aquatics, Track and Field Athletic Cames and Baseball.
No. 117R. Official Athletic Rules (A.A.U.)

Each of following numbers, 50 cents

No. 500B. How to Sprint
No. 501B. College Athletics
No. 502B. Middle Distance and Relay Racing
No. 503B. How to Hurdle

Each of following numbers, 75 cents

No. 504S. Pole Vault
No. 505S. High Jump

Group IX. Water Sports

Each of following numbers, 25 cents

No. 91R. Intercollegiate Swimming Guide
No. 106R. Science of Swimming
No. 107R. Swimming for Women

Group X. Games for Women and Girls

Each of following numbers, 25 cents

No. 17R. Official Women's Basket Ball Guide
No. 38R. Field Hockey Guide
No. 39R. Learning to Play Field Hockey
No. 69R. Track and Field for Girls
No. 115R. Official Handbook **National** Committee on Women's Athletics of American Physical Education Association—Including Official Rules for Aquatics, Track and Field Athletic Games and Baseball.
No. 116R. Women's Soccer Handbook
No. 107R. Swimming for Women
No. 72R. Figure Skating for Women

Group XI. Lawn and Field Games

Each of following numbers, 25 cents

No. 43R. Lawn Games—Archery; Roque; Croquet; English Croquet; Lawn Hockey; Tether Ball; Clock Golf; Golf-Croquet; Hand Tennis; Hand Polo; Wicket Polo; Badminton; Drawing Room Hockey; Garden Hockey; Basket Goal; Pin Ball; Cricket
No. 86R. Quoits, Lawn Bowls, Horseshoe Pitching and Boccie
No. 113R. Official Lacrosse Guide

Group XII. Miscellaneous

No. 105X. Camps and Camping . . . . . Price 35 Cents

Each of following numbers, 25 cents

No. 114R. Official Hand Ball Guide
No. 119R. Croquet Rules
No. 120R. Volley Ball Guide

The following number, 10 cents

No. 234. School Tactics and Maze Running
No. 282. Roller Skating Guide
No. 325. Twenty Minute Exercises

Group XIII. Manly Sports

No. 25B. Boxing Price 50 Cents

Each of following numbers. 25 cents

No. 19R. Professional Wrestling
No. 21R. Jiu Jitsu
No. 30R. The Art of Fencing
No. 65R. How to Wrestle
No. 78R. How to Punch the Bag
No. 118R. Intercollegiate Wrestling Guide

(Continued on next page. Prices subject to change without notice.)

SPALDING'S ATHLETIC LIBRARY

Group XIV. Calisthenics

Each of following numbers, 25 cents

No. 22R. Indian Clubs, Dumb Bells and Pulley Weights

No. 24R. Dumb Bell Exercises

No. 73R. Graded Calisthenics and Dumb Bell Drills

Group XV. Gymnastics

Each of following numbers, 25 cents

No. 14R. Trapeze, Long Horse and Rope Exercises

No. 40R. Indoor and Outdoor Gymnastic Games

No. 52R. Pyramid Building

No. 49R. How to Bowl

No. 56R. Ground Tumbling and Tumbling for Amateurs

Group XVI. Home Exercising

Each of following numbers, 25 cents

No. 51R. 285 Health Answers

No. 98R. Ten Minutes' Exercise for Busy Men

No. 54R. Medicine Ball Exercises; Indigestion Treated by Gymnastics: Physical Education and Hygiene

Spalding Score Books, Competitors' Numbers, Etc.

BASE BALL SCORE BOOKS.

Made in three styles—Morse (Nos. 3, 4 and M); A. G. Spalding style (No. 2); John B. Foster style (No. F). The Spalding style has diamond shaped spaces for scoring.

POCKET SIZE.

No. 2. Board cover, Spalding style. 22 games.....Each, $0.50
No. 3. Board cover, Morse style, 46 games..... " 1.25

CLUB SIZE.

No. 4. Morse style, 8⅜x10⅝ in., 30 games .....Each, 2.25
Score Cards, 1 game.....Dozen, .10

BASKET BALL SCORE BOOKS.

No. A. Collegiate, paper cover, 10 games .....Each, .25
No. B. Collegiate, board cover, 40 games ..... " .65
No. W. Women's, board cover, 27 games..... " .65

TRACK AND FIELD, TENNIS AND GOLF SCORE CARDS.

Track and Field Score Cards.....Dozen, .60
No. I. Tennis Score Card, endorsed by leading umpires; used in national championships; new and improved design; for five sets; in two colors.....Dozen, .75
Golf Score Sheets; used in leading tournaments; size 22x28 in.; match play or medal play (specify which is wanted).....Each, .15
FIELD HOCKEY SCORE BOOK—board cover, 50 games..... " .50
HAND BALL SCORE BOOK—board cover, 100 games..... " .50

COMPETITORS' NUMBERS.

Used in A.A.U., intercollegiate and interscholastic championship events.
Made up in sets (1 to 50, 1 to 100, etc.).
Manila paper.....Per number $0.02 Linen backed.....Per number $0.12
Letters, A, B, C, D, etc., on manila paper, for relay races.....Per letter .05

Any of the above mailed postpaid on receipt of price.

American Sports Publishing Company, 45 Rose St., New York

ARCHIE HAHN.

International, Olympic, Collegiate and National Champion Sprinter.

SPALDING TRACK AND FIELD SERIES OF
ATHLETIC TEXTBOOKS
No. 500B

HOW TO SPRINT

The Theory of Sprint Racing

Being a Compilation of the Best Methods of Competition and Training

Edited by ARCHIE HAHN
University of Michigan, 1906. Holder of Olympic Record for 200 Meters

With an Instructive Chapter on

KEEPING THE ATHLETE FIT

By

CHARLES PELTON HUTCHINS, M.D.

Including First Aid Treatment and Practical Questions on Training Answered by Dr. Hutchins

PUBLISHED BY
AMERICAN SPORTS PUBLISHING COMPANY
45 ROSE STREET, NEW YORK

Copyright, 1929
by
American Sports Publishing
Company

Entered at Stationers Hall

©C1A 7266

Printed in the United States of America

APR -5 1929

TO THE MEMORY OF

JAMES E. SULLIVAN

American Commissioner to the Olympic Games
Athens, 1906; London, 1908; Stockholm, 1912

A Founder of the Amateur Athletic Union of the United States

President American Sports Publishing Company

WHOSE UNREMITTING EFFORTS IN BEHALF OF CLEAN SPORT

HAVE LEFT AN INDELIBLE IMPRESSION ON AMERICAN ATHLETICS,

THIS SERIES OF TEXTBOOKS IS DEDICATED.

PAGE
General Training Rules 163
Indoor Running 171
Early Days of Athletics in the United States 187
Origin of the Crouch Start 199
The Stand-up Crouch Start 205
The First Spiked Shoe in America 209
Lawrence E. ("Lon") Myers—America's Greatest Runner ... 213
Importance of Proper Footwear 221

APPENDIX

KEEPING THE ATHLETE FIT

BY C. P. HUTCHINS, M.D.

Including First Aid Treatment and Practical Questions Relating to Training Answered by Dr. Hutchins

Avoidance of injury—Staleness—Emergency bag kit—Massage and rubbing Sprains—Bruises—Wounds that bleed—Brush burns—Dislocations—Fractures Blisters—Tender feet—Ingrown toenail—Stone bruise—Corns and calluses Muscle and tendon injuries—Knee wrench—Gym itch—Spike soreness—Black toenail—Boils—Weakened foot—Foreign bodies in eye—Unconsciousness from fainting—Shock following injury—Heat prostration—Loss of wind—To counteract a cold.

Questions and Answers—Spike or rusty nail wound—Foot bandage—Minor cuts—Water drinking—Pulled tendons and muscle cramp—Fatigue—Nervous headache—Oily preparations for skin—Skin infection—Counter irritants Weak ankles and bad arches—Dry vs. moist heat—Foot blisters—Massage Cleanliness.

PUBLISHERS' NOTE

"How to Sprint" has been compiled with the idea of presenting to the novice in running and the more experienced sprinter the best ideas on the subject that can be obtained from every source of information.

While the methods of leading coaches of track teams differ in many details, nevertheless the principles of success are basically the same. The instructions in this book, therefore, comprising as they do the consensus of opinion of the most successful teachers, gleaned from every section of the country, present to the reader a fund of information that it is practically impossible to duplicate.

To supervise the compilations submitted by these various authorities, the publishers feel that they have been particularly fortunate in securing the services of Mr. Hahn, who possesses a wide experience, gained first as competitor and later as coach. During his amateur career he established the present world's record for 200 meters, was a winning member of the American Olympic teams of 1904 and 1906, collegiate and national champion, and winner of innumerable events in general competition. Subsequently, as head coach at Brown, and as a member of the coaching staff at University of Michigan (his alma mater) and Princeton, Mr. Hahn has had an unusual opportunity to keep in close touch with all developments in the arena of track and field.

The illustrations in "How to Sprint" have been specially selected from hundreds of photographs with the purpose, primarily, of using them to demonstrate some particular

phase of action that may be used as a basis of instruction rather than that of merely showing a picture of a "headliner" who at the moment may be in the public eye.

In many instances in current periodicals where athletes have been photographed in action the camera may have caught runners out of their true form—sometimes after a finish, when they have begun to relax—with the result that novices who have no other means of seeing champions in action get a wrong impression—due to the reputation of the runner—of what proper form should be, with consequent permanent injury to their own style.

It should be explained here also that for the same reason the critical analysis of the action shown in each illustration is based on the scene as pictured—for reasons noted in previous paragraph—and is no reflection on what may be the usual form of the athlete.

In these illustrations it has been sought to fasten permanently in the mind's eye of the reader the basic principles of good form, from which beginning he can, if a runner himself, correct wrong methods already acquired, or, if a coach, use the pictures to demonstrate instructions he would wish to convey.

Naturally, in a textbook that is primarily intended to point out desirable as well as undesirable form, there must be a considerable amount of repetition, but only by this constant reiteration can such outstanding factors be sufficiently stressed and brought home to the beginner.

AMERICAN SPORTS PUBLISHING COMPANY.

ACKNOWLEDGMENT

The publishers of Spalding's Athletic Library desire to express their appreciation of the interest shown in this new series of Track and Field textbooks by leading directors of physical education, coaches, athletes and other students of athletic sport. For contributions, and helpful suggestions based upon their personal experience, may be particularly mentioned—

MILTON ANGIER
University of Illinois; American javelin record holder

A. M. BARRON
Penn State; coach Michigan Agricultural College

WARREN BOVARD
Comptroller University of Southern California

E. BRADLEY
University of Kansas; national pentathlon champion

GEORGE T. BRESNAHAN
Coach University of Iowa

GEORGE E. BRONDER
University of Pennsylvania; intercollegiate javelin champion

LEROY BROWN
Dartmouth; national and intercollegiate high jump champion

AVERY BRUNDAGE
University of Illinois; national all-round champion

LEROY CAMPBELL
University of Chicago; holder Conference half mile record

TOM CAMPBELL
Captain Yale Track Team

HOWARD CANN
New York University; intercollegiate weight champion

NATE CARTMELL
Coach Penn State College

STEPHEN CHASE
Dartmouth and N. Y. A.C.; former world's record holder high hurdles

BOYD COMSTOCK
University of Southern California; coach U.S.C. and Yale

AL COPLAND
Noted authority on track and field; national hurdle champion

JAMES CURRAN
Coach Mercersburg Academy

CHARLES A. DEAN
Illinois A.C., Chicago; former president A.A.U.

COL. CHARLES J. DIEGES
Leading timer of the United States

STEPHEN J. FARRELL
Coach University of Michigan

D. J. FERRIS
Assistant Secretary Amateur Athletic Union

KEENE FITZPATRICK
Coach Princeton University

ROBERT A. GARDNER
Yale University; holder intercollegiate pole vault record

MATT GEIS
Track Coach Lawrenceville School

HARRY GILL
Coach University of Illinois; former national all-round champion

MAJOR JOHN L. GRIFFITH
Commissioner Athletics Intercollegiate Conference A.A.; originator Drake Relays

ARCHIE HAHN
Assistant Coach Princeton University

M. P. HALPIN
Governor New York A.C.; manager American Olympic teams 1908-12-20

BRUTUS HAMILTON
University of Missouri; national decathlon champion

HARRY L. HILLMAN
Coach Dartmouth College; former Olympic and National champion

H. B. HOFFMAN
University of Michigan; national and N.C.A.A. javelin champion

GEORGE HORINE
Stanford University; former world's champion high jumper

MEREDITH HOUSE
Stanford University; Coast record holder low hurdles

CLARENCE HOUSER
University of Southern California; national weight champion

H. J. HUFF
Director Athletics Grinnell College

ELDON I. JENNE
Washington State University; Coast champion pole vaulter

T. E. JONES
Director of Athletics University of Wisconsin

THOMAS KEANE
Track Coach Syracuse University

FRED KELLY
Univ. So. California; former world's record holder 120 yards hurdles

RICHMOND W. LANDON
Yale University; Olympic and Intercollegiate high jump champion

E. J. LANIGAN
Track Coach University of Virginia

CLINTON LARSON
Brigham Young University; national high jump champion

R. L. LEGENDRE
Georgetown; national and collegiate pentathlon and broad jump champion

J. J. MAGEE
Coach Bowdoin College

PATRICK J. MCDONALD
New York A.C.; Olympic and national weight champion

JOHN T. MCGOVERN
Cornell University; counsel American Olympic Committee; director Public Schools A.L., New York

ALBERT J. MCGALL
Stevens Institute

MATTHEW MCGRATH
New York A.C.; world's and Olympic weight champion

JOHN J. MCHUGH
Public Schools Athletic League, New York; leading starter of national and collegiate athletic events

"TED" MEREDITH
University of Pennsylvania; holder of world's 880 yards record and Olympic champion

NED MERRIAM
Coach Yale University

JOHN F. MOAKLEY
Coach Cornell University; Coach American Olympic Team, 1920

FRED S. MURRAY
Stanford; national and intercollegiate low hurdle champion

E. E. MYERS
Dartmouth; national and intercollegiate pole vault champion

J. P. NICHOLSON
University of Missouri; national high hurdle champion

JOHN K. NORTON
Stanford University; holder world's 440 yards record

WESLEY M. OLER, JR.
Yale Univ.; intercollegiate high jump champion and former record holder

ELMER OLIPHANT
U. S. Military Academy; director athletics Union College

JOHN O'REILLY
Track Coach Georgetown University

GEORGE ORTON
University of Pennsylvania; former national and collegiate record holder; manager Penn Relays

HAROLD M. OSBORNE
Illinois A.C., Chicago; national decathlon champion and record holder

CHARLES S. PADDOCK
University of Southern California; world's sprint champion

PAUL PILGRIM
Director Athletics New York A.C.; Olympic middle distance champion

WILLIAM PLANT
National walk champion

A. R. POPE
University of Washington; national discus champion

LORY PRENTISS
Director of Athletics Lawrenceville School

DR. J. E. RAYCROFT
Director of Physical Education Princeton University

FREDERICK W. RUBIEN
Secretary Amateur Athletic Union; Secretary American Olympic Committee

LAWSON ROBERTSON
Coach University of Pennsylvania

MICHAEL J. RYAN
Coach Colby College

JACKSON V. SCHOLZ
University of Missouri; Olympic champion

ROBERT SIMPSON
Coach University of Missouri; former world's hurdle champion

CLEVELAND STORRS
Yale University; intercollegiate javelin champion and record holder

BART SULLIVAN
Coach Holy Cross College

R. L. TEMPLETON
Coach Stanford University

EARL THOMSON
Assistant Coach Yale University; world's and Olympic 120 yards hurdle record holder

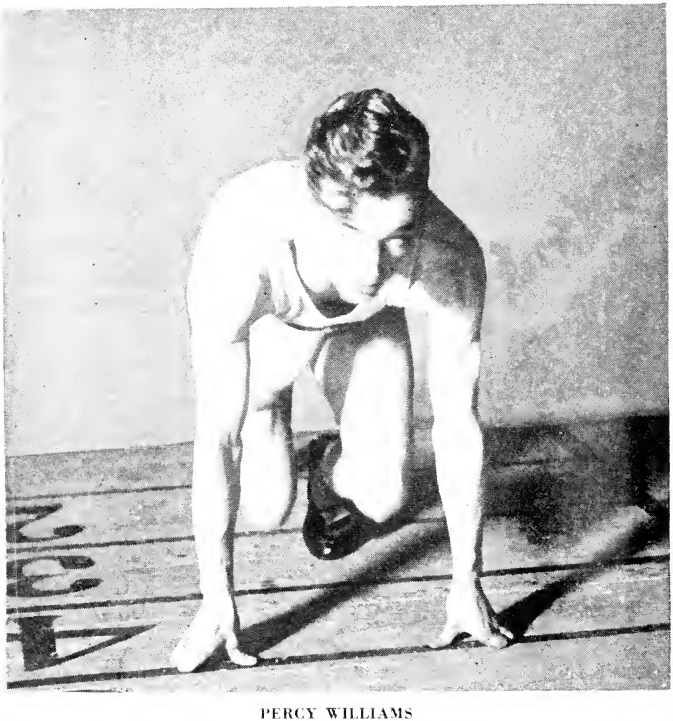
FRED THOMSON
Occidental College and Princeton; national all-round champion

HARRISON THOMSON
Princeton Univ.; intercollegiate hurdle and national all-round champion

RAY B. WATSON
Kansas Agricultural College; national half mile and N.C.A.A. mile champion

B. J. WEFERS
Coach Rutgers College and New York A.C.; former world's sprint champion

B. J. WEFERS, JR.
Columbia and New York A.C.



PERCY WILLIAMS

Williams, the Olympic champion is a natural sprinter. He has a smooth, effortless style and like all athletes of that type he depends more upon a stretch action than a pound. His body angle—a slight forward lean—is in evidence all the time. In his heats and in races that do not require his full exertion he depends largely upon his leg action, but under stress his arms come into play and he combines with his physical exertions a stubborn fighting spirit that aids greatly in the general result.

THE ART OF SPRINTING

Efficiency in any line of physical endeavor is a phase of power to be desired by those who go in for athletics, and in its relation to sprint running, the many sides of which will be discussed here. Not alone is the physical side concerned in the matter of bringing to a focus the ability and capacity which may be in the makeup of the student of this particular branch of sport.

He must approach the tasks to be solved with the will to succeed. Many things in athletics come to us instinctively, and it is in order to get the best results from our efforts toward efficiency that we endeavor to get the practical side of matters athletic—in this case sprinting—down as though by rote, so that little or no mental effort need be expended.

We are not all of one mind as to what means are best, but it is a certainty that in the past many have been perfectly willing to "let George do it," and have worked along the lines of least resistance in their efforts to do their athletic jobs. They were willing to let some other fellow do the thinking whether the results obtained were right for them or not. Custom was good enough for them.

There is as much necessity for the application of correct thinking to athletics, and particularly sprinting, as there is for a similar line of action in any sphere of work. It is not to be denied that athletics is an art and a science the surface of which has been but scratched in the desire to get at some of the precious metal underneath.

CHARLES BORAH

The form shown is generally conceded to be good start action. Subjected to a rigid scrutiny one notes, however, that the uplifted foot has been brought up to a height that makes for wasteful action. The correct lift on coming out of the marks—and this applies to the first and second steps particularly—is one that allows the knee to be lifted sharply upward and gives a down-sloping angle of the shin. This form tends to give a longer stride but slows the action. Borah is holding a lean-forward position, but it has been gained by a conscious effort. It must be remembered, nevertheless, that the comment as made applies to the general athlete and therefore it follows that Borah's style may be best adapted to his particular running form. In running, Borah has perfect stride action and when an athlete depends upon the stride he is apt to bring a trifle of his running form into his start action. His arms are co-operating with his legs, although the semi-clenched fist is preferable to the open-hand position, as shown. Borah uses a cross-arm action in starting, which brings the rear elbow into the position shown.

A necessary harmony must exist between the leg movement and that of the body, which is controlled, in running movement, by the arms. There must be, in order that the best results be obtained, as slight a period of suspension —i.e., lapse between striding efforts—as is possible, with all of the human mechanism co-ordinated in an action which is calculated to yield the greatest striding distance with no unnecessary power needed, and no diminution in the rapidity of the pickup.

In distance running there must be a certain amount of "periods of suspension" because of the difference in striding style between it and sprinting. While both demand close-to-the-ground running, more of the bounding style is used in distance work than where the purpose is a greater rapidity of action such as sprinting demands, in which the period of suspension is reduced to as near a minimum as possible without cutting down the full knee and foreleg action, necessary to a full stride effort.

If one strides short, it necessarily means that if he is to keep up with the procession, he must put in a greater number of efforts than another whose strides are longer. In the first case the period of suspension is made less because of the rapidity of leg movement, while in the other the bounding effort, which demands a longer stay off the ground, abounds in a waste which is as bad as the other in that the best results are not being obtained.

It is therefore the happy medium between these two false styles of action that is to be desired in sprint running. The acquisition of this will warrant the flawless form such as is seen as a general proposition through the medium of superlative performances.

FRANK WYKOFF

The outstanding feature of Wykoff's form, as illustrated in this picture, is the maintenance of his body angle. Ordinarily, a sprinter will allow his body to swing back to an upright position when such a lengthy stretch is taken. Note the straight angle that is in evidence from his rear knee to the back of the head. Note also the correct flex of the forward leg. The form shown is a full stride action of the type that is used in practise. Such an extended leg action, while a ground gainer, would tend to slow up a sprinter in competition. That is to say, a modified stretch is advisable in competition and is recommended for workouts. This exaggerated leg action must be accomplished by a corresponding armswing because the upward swing of the rear arm, when extended backward, aids greatly in the lifting forward of the body so that the forward lean may be maintained. Note the action of the arm muscles and the semi-clenched fists. Such a free-and-easy action demands an easy hip socket action and when this is lacking, the athlete should specialize on mechanical exercises. Observe also the easy head position and lack of neck strain. In other words, action of this type calls for complete body relaxation save in those members which are actually brought into play.

Time and again men have outdone themselves on certain occasions as the undoubted result of having at these times co-ordinated both their muscular and nervous energy to perfection. They have raised and grounded their feet with a precision which argued for excellence of movement, which should be the purpose of every sprinter to develop in order that the period of suspension be as minute as is possible.

At all times the legs should be contributing to the propulsive force which will be kept uniform if the body and arms are contributing their share to the forward movement; the body, by being in advance of the propelling power, and the arms by working in harmony with the leg action.

Contact with the ground naturally will bring about a shock which will tend to increase the period of suspension between strides. It must appeal that this shock must be made as nearly harmless as possible by always having the body angle in a position that gives the legs nothing but the propelling work to do and by landing accurately upon the ball of the foot with the proper amount of elasticity.

It can be argued, and probably with plenty of cases to support the contentions advanced, that men of small stature should make the best sprinters because of their seeming ability to "pick up" in faster fashion than taller men. While probably more than ninety per cent of our sprinters have been men on the small side it undoubtedly would prove the case that were the best of these arrayed against a like number of big men, with everything equal in the matter of speed, the big men would score to advantage.

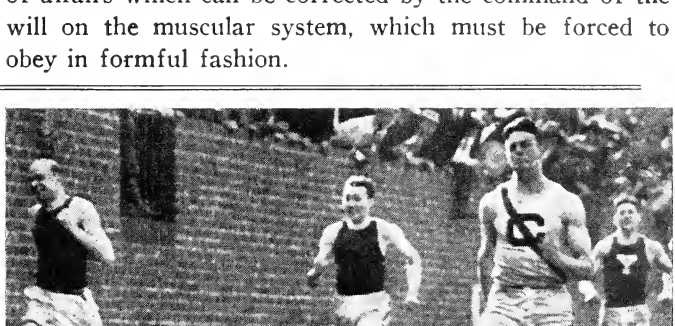
One reason can be advanced for the seeming cause why "big men" do not go in for sprinting, and that is that they

McALLISTER

The form shown is that of the natural all-round sprint performer. He kicks up behind slightly, but not enough to do any real damage. He is apparently making the mistake of trying to accentuate his speed by getting the torso into it. Correct sprinting finds the runner—even when under the greatest finish stress—in a relaxed natural position insofar as his torso and head are concerned. Twisting the head or upper body, or tensing the neck muscles, interferes with the arm action. Generally speaking, the sprinter is showing no particularly bad fault, save the one mentioned. He has a slight forward lean in spite of his head twist and is using a proper length stride.

feel themselves "not gaited" to be sprinters, i.e., they cannot pick up quickly enough to be as successful as the smaller men.

The small men, because of their speed in striding, have a "period of suspension" more minute in degree than is seen in the cases of men who stride long, and because of body poise and lack of harmony in their general action stay "too long in the air" between strides. This is a state of affairs which can be corrected by the command of the will on the muscular system, which must be forced to obey in formful fashion.



Final of 220 yards run, Intercollegiate A.A A.A. Championships, 1923; won by Lovejoy, Cornell; Woodring, Syracuse, second. Woodring's finish form (running on the extreme left) is the most significant feature of this illustration. The other contenders are depending principally upon natural speed and leg strength. The novice sprinter is urged to make a comparison of the various styles in this book, because by so doing he will fix in his own mind the desired fundamentals. Note that Woodring is driving from the toes of his rear foot. His rear leg is fully extended. His body is a single unit and it is well over the landing foot. The forward foreleg is on a line with the rear foreleg, showing the correct chopped finish stride. The shoulders are well relaxed and there is no evidence of neck strain. The forward fist is shoulder high and the entire arm is in position for a straight line pull. Obviously the other arm is also in position. In short, he is exhibiting harmonious action. The others are landing in a flatfooted or semi-flatfooted position. All of them show a lack of forward body lean. Most of them are using a stride style rather than a sprint finish.

Start of a sprint race, University of Pennsylvania Relay Games—A close study of the lead leg action reveals the fact that several of the starters have brought their foot forward, whereas the others have lifted the foot to a higher point behind the body. The former have the right idea of it, but all of them could improve their form by snapping the knee upward in a more decided manner. In starting, the body, and particularly the legs and feet, should drive straight ahead. In this illustration the first and fourth sprinters from the left have abandoned this rule. Note the position of their legs and feet. All of them have the right conception of arm action. Those using the forceful uppercut punch action with the forward arm will get the best results. This should bring the fist approximately opposite the shoulder at this point. The rear arm goes directly to the rear but must be held under control, otherwise it will slow up the return action. Often sprinters in their anxiety to develop the initial arm action stress it to a degree that robs the second arm-swing of its rightful force. Care should be taken in this respect, otherwise the initial arm action becomes a handicap. Regardless of the arm action used after the start, it is recommended that the forward arm be driven straight ahead in a straight line, as an unwise movement at this time is apt to throw the runner off balance. The slightest loss of alignment or balance is ruinous at this stage of the race, whereas the runner's natural strength may counteract his running faults after he is well under way.

WHY SPRINT EVENTS ARE POPULAR

Sprinting always has held the center of the stage in the showing of athletic feats in America and Great Britain. From the earliest recorded days of sprinting short distance events have found particular favor with all types, from novice to champion.

Sprinting is seemingly in line with the alert, nervous type of character, who naturally goes in most strongly for those events which demand rapidity of action with resultant quick decisions.

"Speed—action—more speed" is the driving cry of the age. A "ten second man" is a reputation that epitomizes everything apparently worthwhile in the arena of track and field, while an equally meritorious performance over a longer distance does not evoke anywhere near the same thrill.

The temperament of youth dovetails with the "touch and go" characteristics of sprint running, and because of this possession of a seeming abundance of nervous power such distances as the "century" and the "furlong"—events which can be run on one breath"—are particularly appealing.

The youngster likes to do the average athletic feat in a hurry and have it over quickly. He demands sharp action —a phase which is manifest in nearly every line of endeavor—and as a majority of those who go in for track events are physically what might be termed middle size, the sprint portion of the programme attracts.

Finish of the 1923 100 yards run, Drake Relays. Won by Erwin, Kansas; Ayres, Illinois, second. From left to right: Williams, Kansas State Normal; Laydon, Notre Dame; Tykle, Purdue; Barr, Notre Dame; Anderwoert, Washington; Erwin, Kansas Aggies; Bier, Washington; Ayres, Illinois; Evans, Illinois.—Practically all of the sprinters are using a full stretch stride rather than the slightly chopped stride which is most effective at this stage of the race. Several of the athletes show a slight forward lean but most of them are lacking in this respect. Several of them are using their arms but the majority are handicapping their finish by throwing them away from their bodies. Such action not only robs them of additional momentum but makes it difficult for the legs and body to hold a well poised balance. The winner's front foot position is particularly bad as such a landing makes it impossible for the muscles of that leg to contribute a maximum drive. The toes should point slightly inward or straight ahead. Three or four of the contenders are kicking up behind to an unwarranted extent. These faults are less noticeable during the early part of a sprint race but inevitably come to the surface during a driving fight for the tape. Common sense logic shows that faults of this character must rob a sprinter of valuable time.

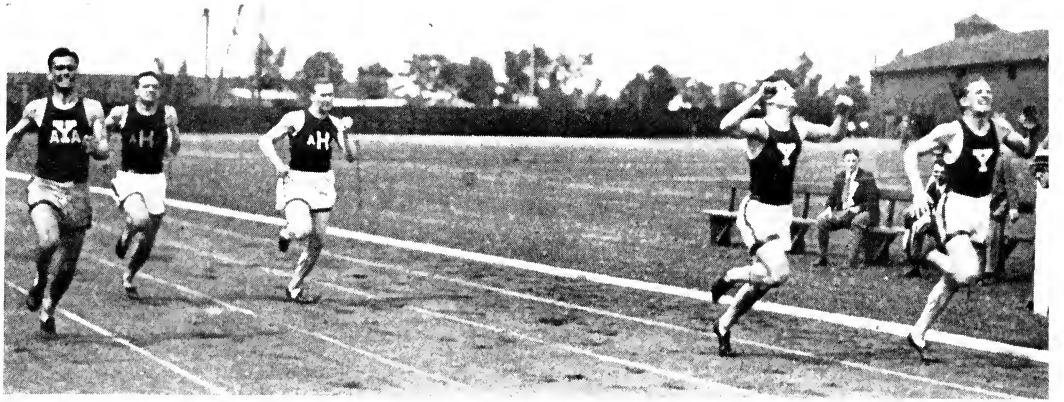
Sprinting, on the face of things athletic, appears easier than longer forms of foot racing. While this is not the fact, it is probably incontrovertible that it appears so, and is taken up by greater numbers than any other branch because it is soon decided.

If one has ability, success will be his portion in a shorter time than if the distance were greater; while in the event of his being of ordinary capability, the margin of defeat will not be so pronounced as at longer distances.

The mental "approach" to athletics of all sorts is a most important step, and in sprinting is a factor which is most valuable. The will to do things is as certain to be productive of good to the physical side as anything which can be nominated.

"Sprinting" may be defined as running at the highest possible speed. The term is often loosely applied to all races up to a quarter of a mile. If, however, one accepts the more restricted meaning, 300 yards may be set down as the limit of man's ability to travel at top speed. Some even question the advisability of putting the limit as high as that. If one speaks of a "sprinter pure and simple," one usually wishes to convey the idea of an athlete whose stamina—or, rather, whose lack of stamina—does not permit him to travel at his fastest for more than 150 yards.

Now, sprinting in the accepted sense is the most natural of all styles of running. In cases of necessity one runs as hard as he can, without the consideration of suiting his pace to the distance to be covered. Therefore, being most natural, sprinting is apparently the most easily acquired of all kinds of running. At any rate it is more likely that

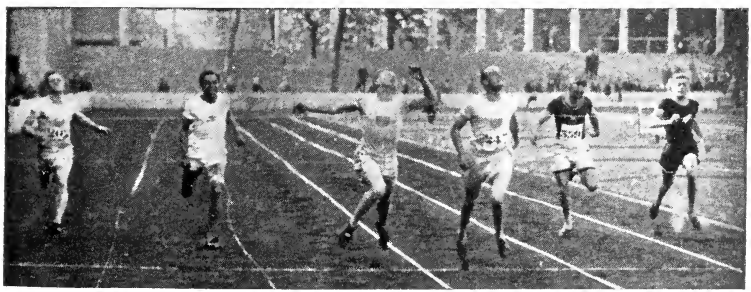


Finish of the 100 yards run. Harvard vs. Yale, 1923. Won by Comins, Yale; Rusnak, Yale, second; Locke, Yale, third.—The winner on the extreme right is sprinting out his race. This is a recommended practise, although many of our best exponents of the game use various types of form at this stage of the competition. It is generally wise to use the clenched hand action rather than holding the hands in the position shown. The sprinter in question is kicking up behind to a slight extent (due to lack of knee lift) and he also shows a trace of neck tension. His form, in the main, is effective. Rusnak, second from the right, is well poised and shows a forward lean (as does Comins), and he is evidently using a sharp knee lift. He has anticipated the tape slightly instead of running it out. In so doing he has thrown his head to the rear Locke, on the extreme left, shows well co-ordinated action and a strong leg and arm drive. The rear arm should not be thrown away from the body in the manner shown, nor should the arm bend be abandoned. The Harvard sprinters show several minor faults, such as shoulder hunch, and a slight loss of balance. Otherwise, both of them are using effective action.

the average youngster will realize more quickly on his ability as a sprinter than as a distance runner.

In the frequent dashes which are seen during the medium of play, the lad with athletic inclinations quickly finds out for himself as to whether he is speedier or slower than his fellows. He finds that he is possessed of greater speed than others in play and as sprinting apparently does not need the stamina necessary for distance running it is one which holds out the greatest promise of success when competition is taken on.

It must not be imagined, however, that all an athlete with great natural ability—or greater than that of his fellows—must do is to step out on a track and show top-notch form. A variety of things must be learned in order that he may be able to properly release—and also conserve—his admitted physical and nervous power.



Woodring winning 200 meter run; Paddock second. 1920 Olympic Games. The two leading sprinters show a tendency to throw their knees inward toward the oposite leg. This type of mannerism often comes to the surface in the heat of a stiff finish. It may be classed as a form fault, together with all positions that tend to throw the legs or body out of alignment. Such traits can best be eliminated at the first of the season. The majority in this race show the right sort of body lean but all of them are handicapped by arm, body or leg faults. The novice can learn much about the form of sprint by checking up on photographic action. By so doing he will form certain definite opinions about the more obvious faults and will be less likely to adopt them himself.

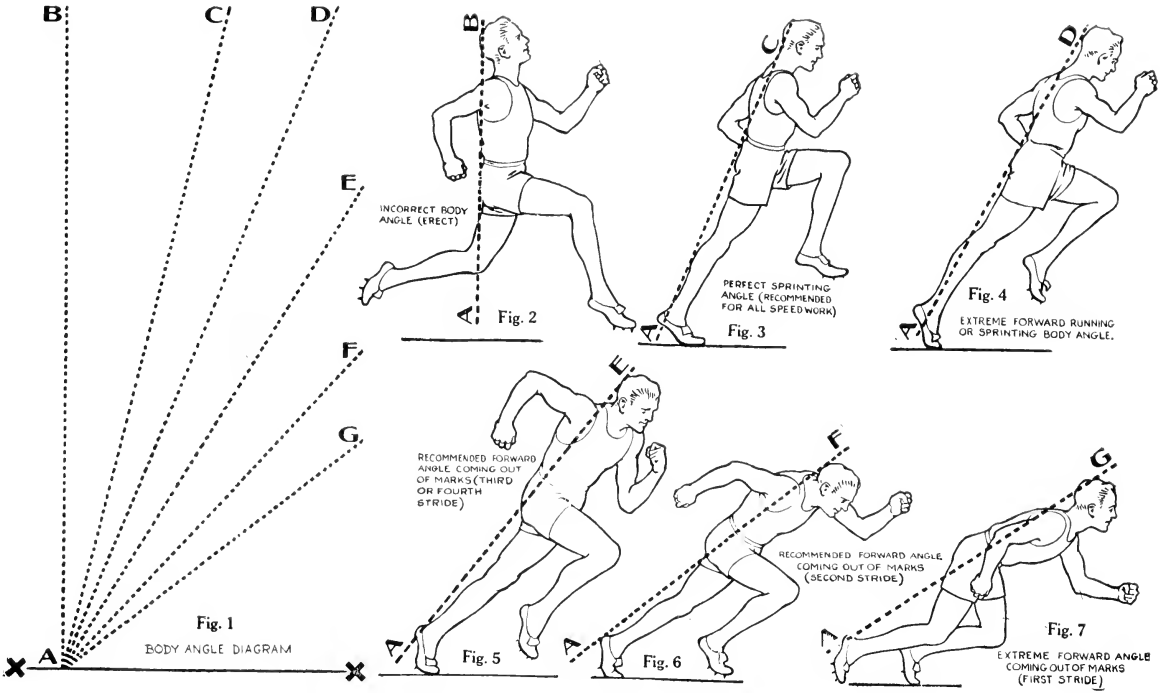

B
C
D
E
F
G
A
INCORRECT BODY ANGLE (ERECT)
PERFECT SPRINTING ANGLE (RECOMMENDED FOR ALL SPEED WORK)
EXTREME FORWARD RUNNING OR SPRINTING BODY ANGLE.
RECOMMENDED FORWARD ANGLE COMING OUT OF MARKS (THIRD OR FOURTH STRIDE)
RECOMMENDED FORWARD ANGLE COMING OUT OF MARKS (SECOND STRIDE)
EXTREME FORWARD ANGLE COMING OUT OF MARKS (FIRST STRIDE)
BODY ANGLE DIAGRAM

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Fig. 7

ILLUSTRATING VARIOUS TYPES OF BODY ANGLES DESCRIBED IN ACCOMPANYING CHAPTER.

THE THEORY OF SPRINT RACING

A casual study of the explanatory captions on the illustrations in this book reveals a great deal of repetition. A lack of space prevents a minute criticism of each runner's "form," but in most cases attention has been called to apparent outstanding defects as well as action that makes for good "form." Perfect "form" calls for a strict adherence to a great many small points, but in the main we are largely concerned with the factors that play the greatest part in the general action, i. e., those that obviously deter or facilitate the actual speed of the athlete. These factors are limited in number and include such fundamentals as correct arm-and-leg action, body angle, balance, and several other points of related importance.

It is only natural, therefore, that each caption shows a constant reference to the foregoing citations. It is to be hoped, however, that this constant repetition will drive home the vital importance of correct fundamentals and that the monotonous refrain, "the runner on the right shows poor body angle," or "the winner has failed to maintain his balance," and similar references, will create a desire for something more than a merely successful runner.

The natural runner, possessing exceptional speed by reason of extraordinary leg power or better co-ordination, always will retain a seat of prominence in the athletic world, in spite of obvious "form" faults. This much is certain, because no amount of mechanical training will compensate entirely for the lack of natural ability. As

most of us are not exceptionally fast, if we are to compete successfully it is essential that we run according to scientific principles. A fair amount of natural ability, supplemented by an intelligent application of common sense and "form" fundamentals, will go a long way toward bridging the space between the ill-trained runner and the fast natural champion.

It is again necessary to call attention to the fact that the ideas set forth in this book may not meet with unanimous approval, on account of the numerous schools of coaching. An honest effort has been made in this respect, to call attention to the best known styles, incidentally making it extremely difficult to set forth with any degree of accuracy a complete series of recommended directions.

As a general rule, athletic "schools," or proponents of a certain athletic theory, are established by record-breaking athletes, directly or indirectly; directly if in after years they become instructors in the sport, and, indirectly, if others, catching their individual "form," use it as a basic principle.

In the final analysis, "form" always must be individual and not general. If all athletes possessed a standard physical frame and mental equipment, "form," as a natural sequence likewise would be standard. Such a condition being obviously impossible it hardly seems wise to stress the teachings of any one "school" of athletic thought.

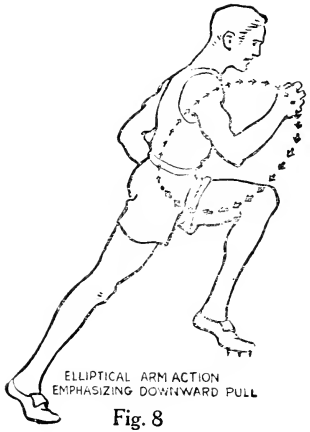
Having this point in mind, it is the purpose of this book to point out the better known fundamentals of action, or, rather, fundamentals that generally apply. There are exceptions to the rule in every instance and it holds true insofar as athletic "form" is concerned. An athlete may at

any time violate all of the recognized standards of style, establish a new mark in that event, and yet possess effective *individual* "form."

A novice can cultivate easily his ability to judge a runner's "form," or his own, by first learning to detect the presence or lack of the mechanical fundamentals as illustrated by photographs. Figure 1 may be called the key to the plan. By placing this simple outline, or one similar to it (drawn on tracing or tissue paper) over photographic action, preferably taken from the side or nearly so, the "running angle" or forward "body lean" faults are easily established. Point A should be placed next to the heel of the rear foot, if the leg is fully extended and touching the track. If the rear foot is not in this position, the lower leg action may be disregarded, but the upper body action may be checked by placing the diagram over the figure and adjusting its lines to the line formed by the upper body, including the upper part of the leg. The line, X-X, should be parallel with the bottom of the page or photograph, so that the line, A-B, will be straight up and down, as the various running, sprinting and starting angles are judged by their relation to an erect position.

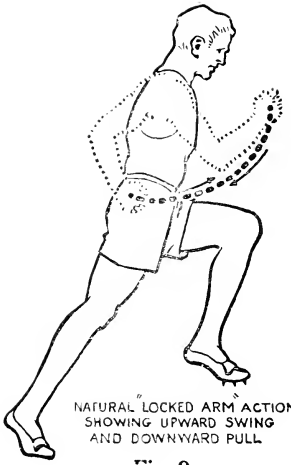
The same result can be obtained by using two rulers or pieces of cardboard, one to establish the erect vertical angle; the other to follow the leg and body or upper body angle.

A novice will benefit by obtaining his own photographic action so that he can make tracings of it, of the sort shown in Figs. 2 to 7. His form faults will come automatically into prominence by resorting to this method. After a time the novice will find that his eye has been



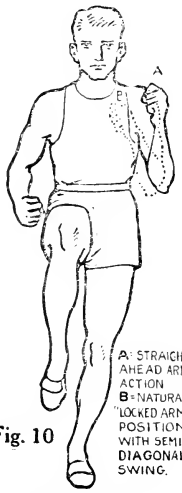
ELLIPTICAL ARM ACTION
EMPHASIZING DOWNWARD PULL

Fig. 8



NATURAL "LOCKED ARM" ACTION
SHOWING UPWARD SWING
AND DOWNWARD PULL

Fig. 9



A: STRAIGHT AHEAD ARM ACTION
B: NATURAL "LOCKED ARM" POSITION WITH SEMI-DIAGONAL SWING.

Fig. 10

UPPER AND LOWER
HAND POSITION

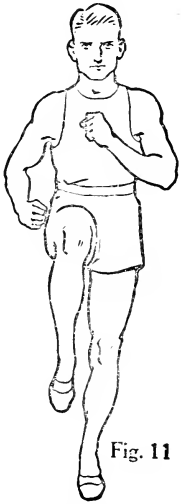


Fig. 11

DIAGONAL
(CROSS-BODY) ARM ACTION
(FRONT VIEW)

trained to catch certain positions automatically, and with this ability to aid his vision, a running figure may be substituted for the photographic studies. The visualizing method will give the observer an approximate working idea of a runner's angle.

The coach or observer should make a point of standing well to one side when checking up on his runners or sprinters, unless some other department of the event claims his attention.

The term "running angle" has been used consistently throughout this book and for this reason demands a graphic illustration, in addition to the explanation accorded it, to the effect that it is an approximate straight line effect from the rear heel to the back of the head, formed by the rear leg extension plus the upper body line.

Body angle cannot be fixed arbitrarily, as the form of the runner and his physical characteristics often will determine the extent of his forward dip. Generally speaking, *it should approximate the line, A-C in Fig. 3;* never less, and often as far forward, as the line, A-D, in Fig. 4. A few sprinters specializing in the pounding, abbreviated stride-drive action drop still farther forward during certain periods of the competition.

Track athletes as a rule overlook the real significance of the forward lean and in attempting to place the upper body ahead of the landing foot often bend at the waist instead of leaning forward from the rear foot.

The full body angle is really divided into three sections, being made up of the head, upper body (from the waist to the neck) and the leg. When the three sections are in position, an imaginary straight line is formed, otherwise a break mars the straight line effect.

Most successful middle distance and distance runners show a natural tendency toward an easy forward body lean, whereas sprinters as a rule show the reverse of this trait when competing. The wrong sort of competitive arm or leg action, or poorly executed "form" of any type, will as a rule produce a minimum amount of body angle. The sprinter can make certain of his "body angle" by making it a daily and permanent habit and assist the formation of this habit by a definite mental concentration, to offset the effects of fatigue and muscular strain.

The line, A-G, in Fig. 7, shows the extreme forward lean that is used as the runner comes out of his marks for the first stride. The full extension of the rear leg, as shown in Fig. 6, may produce the same angle, but generally the A-F angle is a natural result. This drop should be gradually lessened to the A-E line of Fig. 5; thence to the A-D line of Fig. 4 and, finally, should produce the recommended A-C line of Fig. 3.

Too much angle may be as bad as a lack of forward lean, hence the novice should adjust his own angle carefully, rather than arbitrarily adopting a certain fixed lean. The A-B line of Fig. 2 shows a common finish pose, and many sprinters take a similar position during the final drive, either by leaning to the rear, or not enough ahead of the A-B line to allow a maximum amount of driving momentum. It is usually attended by a "chin lift" or a break in the upper section of the angle. A poor starter will take an approximate A-D or A-C position on his first stride and eliminate the intermediate angles which are essential to fast work out of the marks.

This body lean used so effectively in sprinting, is nothing more or less than a matter of body balance. It

is used on the foot ball field and in everyday life. Nearly everyone involuntarily uses a forward lean of the identical type described when called upon to push a heavy object across the floor. Children take the same position when they attempt to hold a door against their playmates. Tug-of-war contestants take an opposite position when pulling against their opponents, because the position is one that does not make running, or forward progress, easy.

The forward lean, if exaggerated, will force the user to run or fall forward on his face. A sprinter's physical energy can be directed effectively only when the running angle is correctly placed. The leg action is really engaged in a contest with the falling-forward action. One tends to throw the body upright; the other tends toward a falling motion. A portion of the momentum is lost when the erect tendency prevails or when a lack of pushing traction is prevented by an over-exaggerated forward lean.

This can be proved by standing still and bouncing up and down, as such exertion tends toward height rather than distance. The same thing happens to a limited degree when a runner abandons his forward lean for an erect position, as a certain amount of the foot force is lost in the upward tendency, whereas a forward tendency is desired.

A sprinter or runner should really hold the body (torso) more or less rigid while competing; more so in sprinting perhaps than in running, when an easy unaccented shoulder swing is often effective. Not in the sense of being stiffened, but rigid insofar as position is concerned. In other words, a position unchanged by the

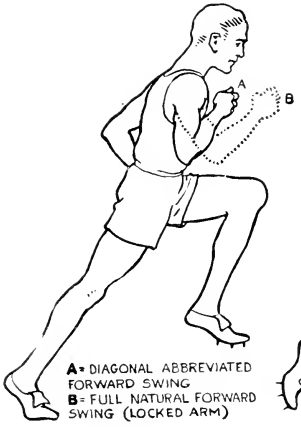


Fig. 12

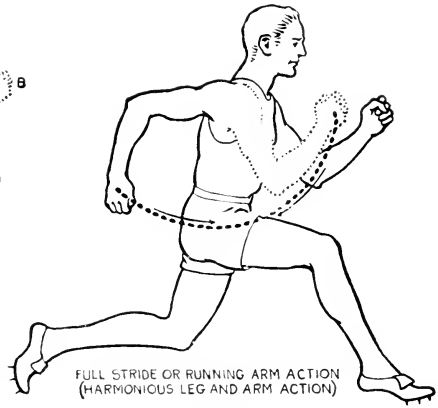


Fig. 13

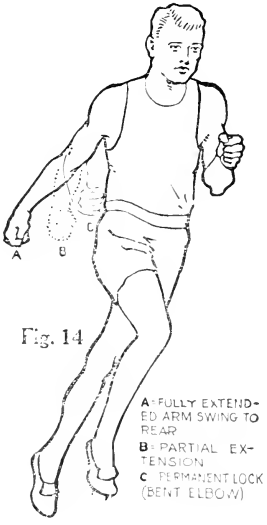


Fig. 14

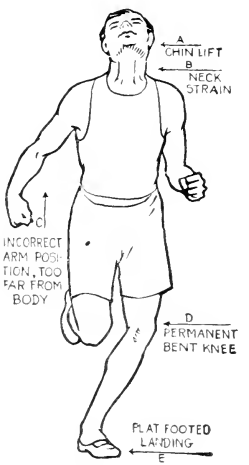


Fig. 15

strenuous actions of the propelling legs and driving arms; the shoulders and hips taking care of the driving factors by holding to an easy relaxed position, assisted by the knee action.

A track athlete will find by experimentation that it requires a distinct effort to run when an erect position is taken. The reverse is illustrated by one's everyday stumbles, which inevitably produce a series of quick, short, chopped steps in the effort to regain equilibrium.

As has been mentioned, it is a case of body balance. When the body is held forward we find it easy to run, as it is much easier to push someone backward when he is off center. The erect position is the center. We attempt, by running, to push ourselves forward; to do this we fully extend the rear leg each time, as we would if we were pushing. We use our feet to best advantage for a foothold; we hold ourselves in a straight line (single unit), because a short straight line is harder to break than one showing a series of angles or bends.

The lack of the forward lean can be detected easily from the front or rear by watching the foot landing, head, knee or arm position. Upraised arms often produce an erect finish position. A forward stretch will accentuate the forward lean, just as it does in the high hurdle clearance. An over-emphasized arm-swing will also injure the body angle, whereas a proper downward chop (in sprinting) will throw the body forward. The correct knee lift will cause erect running if it is not watched and counteracted and the incorrect, wasteful kick-up behind will accentuate the falling-forward action, if over-exaggerated. Erect runners as a rule are flat-footed runners, a foot

fault that robs the body of its natural, proper resiliency, causing "body jar" and an upward, rather than a forward, tendency.

Runners using a full foreleg stretch will not use the same exaggerated type of body angle, which is an effective and essential factor of the drive type sprinter, but his constant forward stretch must be counteracted by a certain amount of body lean. At no time should such a style runner fail to maintain a position slightly ahead of dead center.

Each sprinter, to again emphasize the point, must decide by experimentation and by an analysis of his physical abilities, the proper degree of "lean." Natural runners, or those without training, run with a fair body balance when jogging or striding easily, but lose the advantage as soon as they extend themselves. It might be said, therefore, that the forward lean or body angle is in reality a natural faculty, designed for "balance," just as the arm swings forward with the opposite leg.

ARM ACTION.

As has been explained in the text, the arm action works harmoniously with the leg action, increasing its length of swing or decreasing it, to conform to the leg stride. This is a natural sequence up to a certain point, after which the inexperienced runner or sprinter will either accentuate his leg action and, by tension, handicap his arm action, or will allow his arms to swing wild, with a consequent loss of the body balance and a negligible amount of progress. The trained runner, on the contrary, will use his arms to advantage as "balancers" when cultivating his leg stride

and as secondary driving rods when additional speed is required. The majority of successful sprinters have used their legs to advantage, if not with perfect form, but few of them have fully realized the immense value of the arms as important factors in sprinting and running. This particularly applies to the former branch.

With increasing distance the arm action becomes less vital, in that its importance is minimized. Middle distance runners have perfected in the main an easy, relaxed arm-swing, of the extended or "locked arm" type, which assists, but primarily does not tire the body and does not interfere with the leg action. It becomes a sort of harmonious shoulder-swing, but without sufficient exaggeration to throw the body off balance.

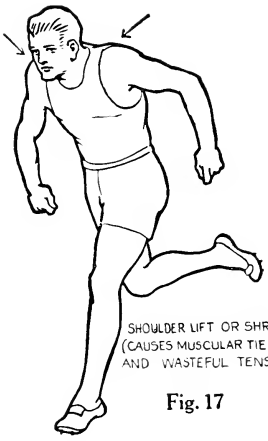
The true sprint arm action is a cultivated "form." It depends upon a straightforward action and emphasizes the down swing, as illustrated in Fig. 8 and "A" of Fig. 10.

The natural arm-swing, better known as the "locked arm" style, calls for the same action that is used in the ordinary walk and makes use of a slightly diagonal or inward swing, as illustrated by Fig. 9, "B" of Fig. 10 and "B" of Fig. 12. Users of this "form" place as much emphasis on the backward pull as they do on the forward swing. The "locked arm" effect is gained by raising the fully extended arm to a fist-forward position, producing a bent or semi-flexed elbow position.

Both forms are recommended for the sprints. The former fits in nicely with the chopped, forceful leg drive, and the latter works well with the more natural stretch-stride "form." In both instances an "opposite the hip" and

Fig. 16

HIP ACTION
(MINIMUM KNEE LIFT ACTION)



SHOULDER LIFT OR SHRUG
(CAUSES MUSCULAR TIE UP AND WASTEFUL TENSION)

Fig. 17

Fig. 18

SHOULDER TWIST
(AN EXAGGERATED SHOULDER SWING)

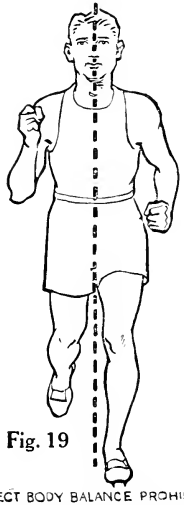


Fig. 19

CORRECT BODY BALANCE PROHIBITS SIDE SWAY AND UNEVEN DISTRIBUTION OF WEIGHT OR EFFORT

an approximate "shoulder level" position is taken by the alternating hands. Experts agree that the hands never should exceed the approximate shoulder height (the hand being held at a fair distance from the chest) when going ahead and that the rear hand should never go to the rear of the body, although the elbow necessarily will do so. Following out the same economical theory, the rear hand or arm should never be thrown too far away from the hip. Reasonable deviations in competition may be expected.

Fig. 11 and "A" of Fig. 12 show an average "diagonal" or cross-body swing, which has a natural tendency to bring the fist in close to the chest. This form, particularly when it is exaggerated beyond the pose shown, will interfere with a straightahead drive and it also must necessarily tend to throw the body into an upright position.

The value of the cultivated straightahead action lies in the fact that it calls for a carefully devised scientific manipulation of the members, whereas the user of the natural method is not apt to be overly careful as to his hand and arm positions, and when this carelessness exists it may produce a great deal of wasteful action. Poorly applied energy does not always mean a great deal in the short races, but it is a factor. Then, too, a badly manipulated arm will throw the sprinter off balance, produce a muscular tie-up and generally slow up his action—and above all things sprint action must be of a snappy order.

The down pull is used with the down chop of the opposite leg to add force and concussion to the "foot stamp," as in the high jump. This downward action not only adds force to the general movement but it also creates an effec-

tive defense against the upward "knee lift" action which, when not contracted, will tend to produce erect, or semi-erect, running. The forward lean can, of course, be maintained by mental determination, but a scientific "form" should take care of such a problem mechanically; hence the falling-forward action is being aided constantly by the downward arm-chop, while in opposition to it we have the full, or semi-knee, lift which is in evidence as each stride is taken.

In discussing the arm action it must be understood that the arm action of the start (coming out of the holes) differs from the full action sprint. In sprinting, the hands should not go behind the body and the arm is never fully extended, whereas the initial arm-swing, taken in conjunction with the first stride, is a wide—almost full—arm extension; this extension is gradually lessened as a normal sprint body angle is obtained.

It must be admitted that a number of world's champions have used non-recommended arm action, such as the full "diagonal" and various other modifications of the natural and straightahead movements. This state of affairs always must exist to a certain extent and certainly as long as the natural athlete is allowed to perfect his own form.

From a theoretical standpoint it appears that the down swing, or a chopped abbreviated downward action of the straightahead type, is better suited to certain types of athletes and that the equally stressed forward and backward natural swing fits in with other exponents of sprinting, but others will continue to emphasize the upward swing, will use an elongated swing, or will modify in some

respect the two recommended styles. For instance, the elliptical action may be entirely eliminated by cutting out the backward elbow snap, so that the hand be merely lifted upward to the start position, following the same line during the forward course, as it does on the down swing, similar to the line shown in Fig 9, but still emphasizing the downward action rather than both the upward and downward.

Fig. 13 shows a typical full stride action (the same approximate hand and arm position being shown in "B" of Fig. 14). The action is exaggerated but harmonious and is of a practise type rather than competitive. The 220 yards man, using a longer stride, naturally and properly, will use a more extended arm-swing, the hand going to the rear behind the hip. The abbreviated action is recommended for the 100 yards or when a fast, short burst of speed is desired.

Distance men and middle distance men use the three arm positions shown in Fig. 14 to aid their sprint-stride or to relax the arm position. This figure shows more of a natural swing, whereas the straightahead style would bring the hand closer to the hip; more so than the "A" and "B" positions.

Fig. 15 is self-explanatory. The chin-lift will produce a muscular neck strain and is usually accompanied by a semi-flatfooted or full flatfooted landing. The bent knee is a physical mannerism and is a bad fault, as it prevents a full push-off, which is a fundamental of running and sprinting. The rear leg always should be finally extended as the body goes forward for the follow-up stride. The flatfooted landing jars the body, overlooks the value of

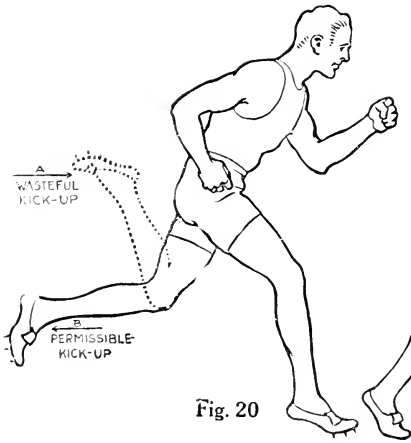
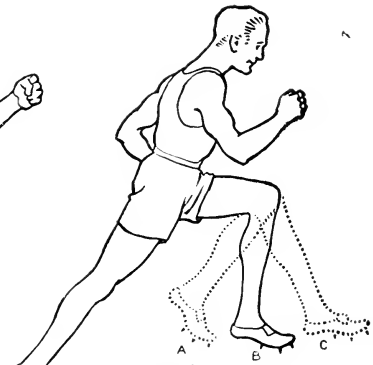
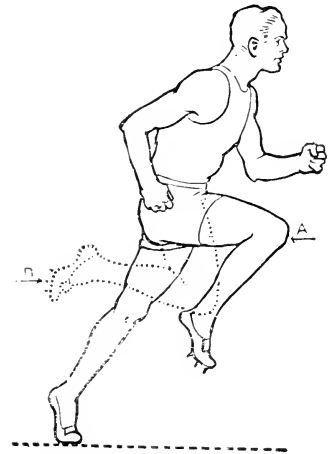


Fig. 20



A = CHOPPED KNEE LIFT STRIDE
B = MEDIUM LENGTH STRIDE
C = FULL FORELEG STRETCH

Fig. 21



STRIDE ACTION
A = KNEE LIFT STRIDE (DIRECT ACTION)
B = FOOT KICK-UP STRIDE (DELAYED ACTION)

Fig. 22

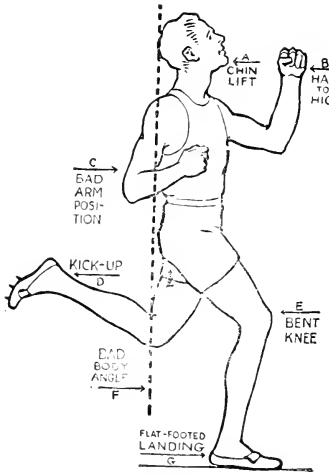


Fig. 23

the push-off and generally tends toward ineffective and faulty sprinting.

Fig. 16 emphasizes hip action, which is one of the fundamentals of track and field athletics. It properly should be accompanied by a certain amount of "knee lift" action, however, as this pose is almost identical with that used by a walker. Every sprinter should possess a flexible hip and, as has been explained, a stride is dependent upon either the hip or knee action or combination of both, the latter being preferable. Middle distance and distance men use this "hip action" form to advantage and sprinters should add such exercises to their schedule in conjunction with "knee lift" exercises.

The shoulders should be always held in a normal, relaxed position and any indications, of the "shrug" or "lift" as illustrated in Fig. 17, should be instantly eliminated, as it merely indicates the existence of considerable upper body muscular tension. Lifting the arms for the "lock" does not mean that the shoulders also should be lifted. Muscular tension or "tie-up" means a loss of from one-fifth to three-fifths of a second in a hundred, when it is found in the non-active portions of the upper body.

Fig. 18 shows an exaggerated shoulder twist, which tends to throw the body out of alignment and also slows up the action. The short sprints specify a complete elimination of the shoulder twist. It may be classed as waste motion in the sprints, although an easy shoulder swing is a natural sequence of the long stride, for by allowing the shoulder to drop back the stride is automatically lengthened. Middle distance and distance men find it a distinct

advantage when it is applied to an easy, swinging stride and it often does aid the sprinter when he does not possess the correct sort of arm action. In other words, if a sprinter's arms were tied loosely by his side, his shoulders would permit fast action by their accommodating swing. The scientific sprinter should avoid any exaggeration, although his natural form may insist upon a tinge of this swing.

Fig. 19 is intended to bring home to the novice the value of consistent, even action. A poorly trained sprinter may be compared to a novice bicycle rider who by reason of his inexperience will constantly make use of an uneven action, by overstressing his leg push or by dropping his body to one side. As a result, he will not follow a straight course. An accented leg push or drop lean will throw the wheel in the opposite direction and he must then instantly counteract the tendency by stressing the other leg action and by leaning in an opposite direction. All in all, he is not working to advantage, and he is not covering the distance between two points with a minimum of exertion and time. The sprinter's arm and leg action should be of a type that will permit the maintenance of an approximate straight line of the sort illustrated in this drawing. Any deviation from it means a certain loss of energy and time.

The "kick-up" is perhaps the most common fault of all, as it is a natural sequence. All natural runners use it to a certain extent and even the trained college runner in his desire to go ahead has a consistent tendency to throw up his heels, as is shown by the constant references to it in the captions of this book. A permissible "kick-up" of

the knee high variety is shown in "B" of Fig. 20, and it may be said that in general any rear upward foot action beyond this point is wasteful of time and energy. The first loss is the greater, and as time is the essence of racing this sort of faulty action should be rigorously excluded. It is difficult to estimate the actual loss in time and physical energy, but when it is understood that the foot in each instance usually is lifted from the ground (or track) to an approximate "A" position before it can go forward to a landing, a fair idea of the waste and delayed action may be gained.

The kick-up can best be counteracted by stressing the knee lift action, as shown in Fig. 22. The knee lift is a fundamental of sprinting and many coaches believe that it has an equal value in middle and long distance work. The majority, however, feel that it should be limited to the short events. The novice should experiment along these lines and determine for himself, the most advantageous style of modification. Generally speaking, every runner should make use of a certain amount of knee lift, regardless of the distance. A correct "knee lift" stride will practically eliminate the "kick-up," or cut it down to a minimum loss.

Fig. 21 shows the versatility of the knee lift action, as from the extreme height of the lift any one of three types of strides may be scientifically negotiated. The dotted foreleg, "A," is used in coming out of the marks, or a modification of it may be used whenever a quick burst of speed is needed. The medium length modification, as shown by the foreleg, "B," will easily allow the sprinter or runner to get ahead of his landing foot and combines

Fig. 24

"SPREAD RUNNING"

Fig. 25

"LINE RUNNING"

Fig. 26

KNEE SWING (INWARD)

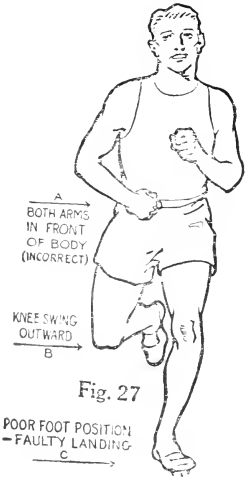


Fig. 27

a fair amount of resultant stride length with a strong down drive. The fully extended foreleg stretch, as shown by "C," permits a maximum length stride, and if the body angle is maintained and supplemented by the right sort of arm action, it also will permit the momentum of the body to throw the runner ahead of his landing foot as it hits the track.

This stretch stride is not a pure sprint action, however, being more of a stride stretch for ground gaining purposes. The purpose of this drawing is to show that this sort of a mechanical knee lift stride will accomplish everything that is commonly credited to the natural "kick-up" or semi-"kick-up" natural stride, with less wastage and without forming bad habits. Any natural runner can evolve a most effective style by inserting a bit of this "knee-lift" action.

Fig. 23 is also self-explanatory, as all of the points have been described in the foregoing matter. The left hand is too high for an efficient form and the right arm at this stage should go farther to the rear. The "kick-up" is obvious, as is the erect running angle, flat-footed landing and bent knee.

"Line running," as illustrated by Fig. 25, is a natural fault that should be modified. It destroys the straight-ahead action and destroys balance. "Spread running," shown in Fig. 24, is advocated by certain coaches because a few champions have used a modification of it to advantage. If the inner muscles of the upper leg are unusually heavy, a certain modification of the normal spread is advisable; the normal spread being about equal to an ordinary standing position. Barring the exceptional

user, it is not recommended as correct action. Both faults can be easily broken by adopting for a certain time the opposite extreme.

The inward "knee swing," Fig. 26, is a mannerism that should be corrected; it is often used in conjunction with spread running. It tends to destroy the direct forward action and any leverage that is gained by adopting this "shove-off" is offset by resultant balance faults.

The outward "knee swing," shown in "B" of Fig. 27, comes under the same heading as the "inward swing" and should be eliminated. Holding both arms in front of the body at the same time, as shown by "A," is a direct contradiction of the laws of body balance. When one arm goes forward, the other should go to the rear, working harmoniously with the opposite leg. The head of this figure is also slightly off to one side, a minor point but one that often adds its mite of damage. Poor foot action is a big fault and is often overlooked as being of minor importance. Note that "C" indicates such a landing. The toe is pointed outward and the inner edge of the sole is striking the ground in advance of the sole. The toe should always swing straight ahead or slightly inward, so that all of the toes will aid in the push-off. A square landing is also essential if maximum traction is to be obtained.

Fig. 28 shows various start positions; the long start being shown by "A," which calls for a "knee opposite the heel" spread; the short spread calling for an approximate "B" rear foot position, so that the knee is opposite the toe of the forward foot and an approximate indoor start position, shown by "C," when an indoor shoe without spikes, is used (and without start blocks). Five inches is ap-

proximate distance between the start line and the front start hole, but may be varied slightly to suit the individual needs. The short spread permits a fast first-stride effort, because the foot has less distance to travel from the start to the destination. Many sprinters by reason of their physical conformation find the long spread the more desirable, hence no set distance (spread) is recommended beyond the general instructions already given.

The "Get set" arm position, as shown by Fig. 29, illustrates two standard arm position faults. The short spread, "A-A," does not allow a direct swing to the rear, produces a precarious balance and incidentally cramps the athlete to maintain this position. The wide spread, "C-C," does not allow the athlete to raise his upper body to the correct level, thus throwing the rear central part of the body to an undesirable height, whereas an approximately level back position is desired. It also cramps the athlete and does not allow a straight swing to the rear. The arm swing at the start is an important factor as a direct swing to the front and rear is necessary if balance is to be maintained while coming out of the marks. No point is too small to be overlooked at this stage of the race. A sprinter can only realize maximum speed when he eliminates these seemingly inconsequential faults. In "B-B" is shown an easy, normal spread, which can be obtained by holding the arms by the side and sinking easily into an "On your marks" position. The rear swinging arm will just graze the side of the body without any deviation in its course.

Fig. 30 and Fig. 31 illustrate two types of finish action. The upthrust arms shown in Fig. 30 tend to produce an erect position. It must be remembered that the finish is

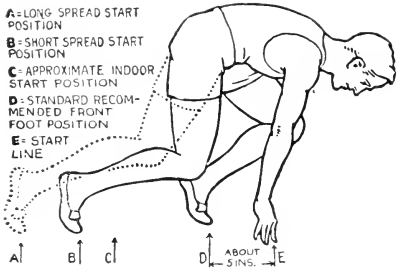


Fig. 28

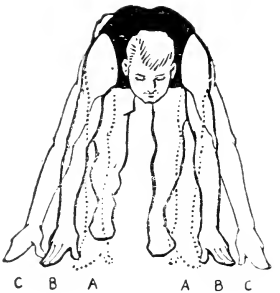


Fig. 29

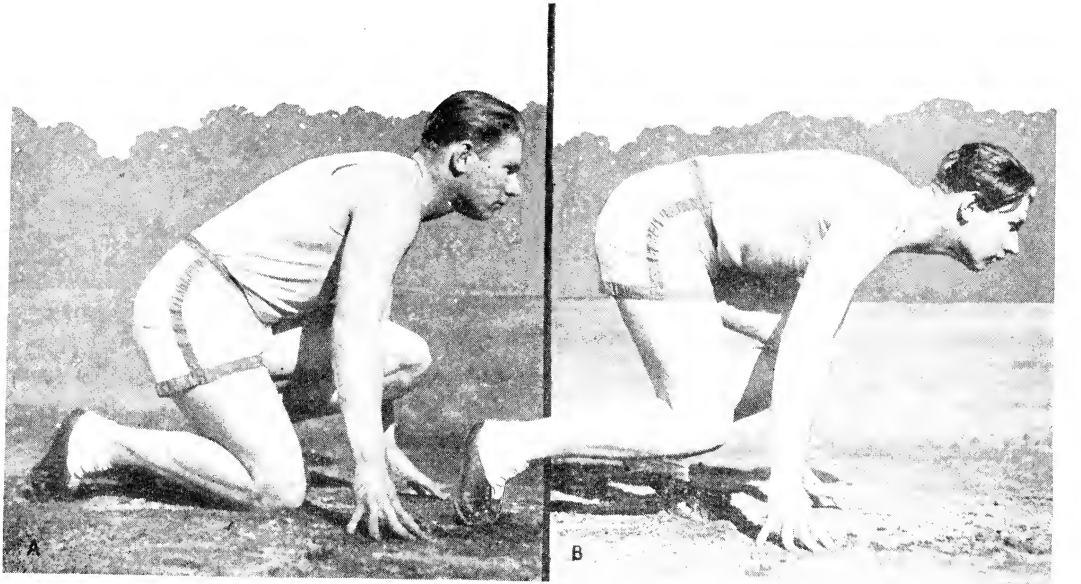
"JUMP" FINISH (BOTH FEET OFF GROUND)
UPWARD ARM THRUST BAD FEATURE
OF ANY FINISH STYLE — CREATES
UPRIGHT BODY ANGLE - RETARDS FINISH

Fig. 30

Fig. 31

judged by the body (torso) and not the legs; therefore any action that will retard the torso is not recommended.

The value of the "jump" and "run-out" styles of finish has been discussed and is a matter of individual choice, although the latter is preferable in almost every instance. Fig. 31 shows that a forward arm-thrust will incline the torso toward the finish line and therefore the so-called "shoulder snap," which is accomplished by holding to the standard arm and leg action until the tape is almost reached and then suddenly snapping the near shoulder and arm forward to take the tape, is a move in the right direction. The upthrust arm is injurious (Fig. 30), and should be eliminated. The forward arm action or "shoulder snap," or a combination of both, is recommended.



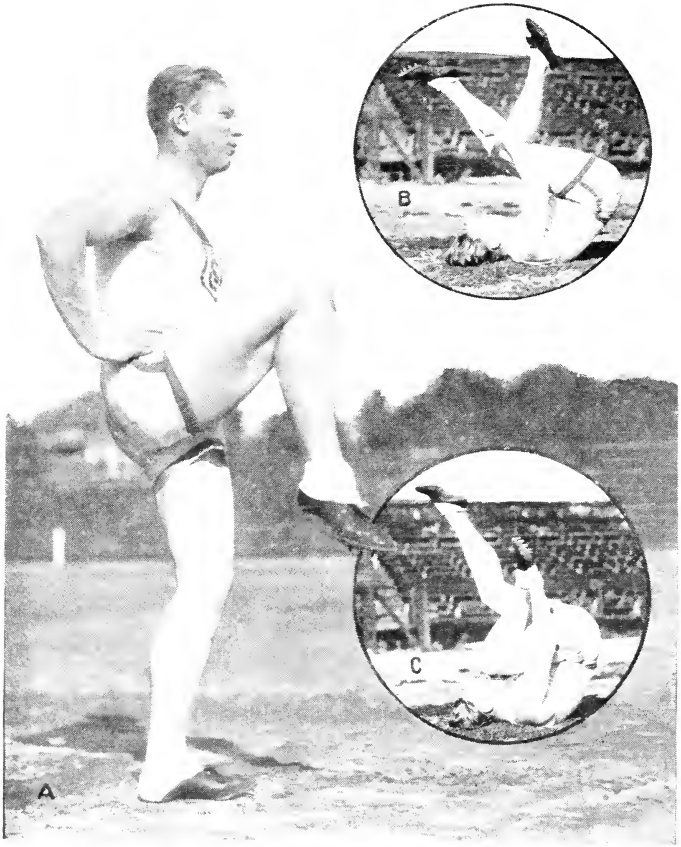
Charles Paddock, University of Southern California, world's champion sprinter; illustrating the "On your marks" start position with a short foot stretch. Note that the rear knee is ahead of front toe;; also note relaxed position of body, approximate "five inch distance from start" line, and "tripod" finger spread. (B) Illustrating a "get set" position. Note perpendicular rear foot position and modified front foot pose. Also slight downward drop from knee of rear leg to ankle; straight line back position, almost normal head position and general distribution of weight. The body is leaning well over the start line in the recommended fashion.

THE MECHANICS OF SPRINTING

Photographic studies of past and present sprint champions, on the marks, in full forward action and at the finish, reveals the fact that few of them ever develop mechanical form to a degree of perfection. All of them have possessed natural speed but in the final analysis, their success has been due to this factor rather than to cultivation of flawless technique. Their general action may be sufficiently rounded out to produce record marks, but it is a fact that most sprinters have made respectable marks on natural ability alone, assisted perhaps by a casual knowledge of the standard crouch start.

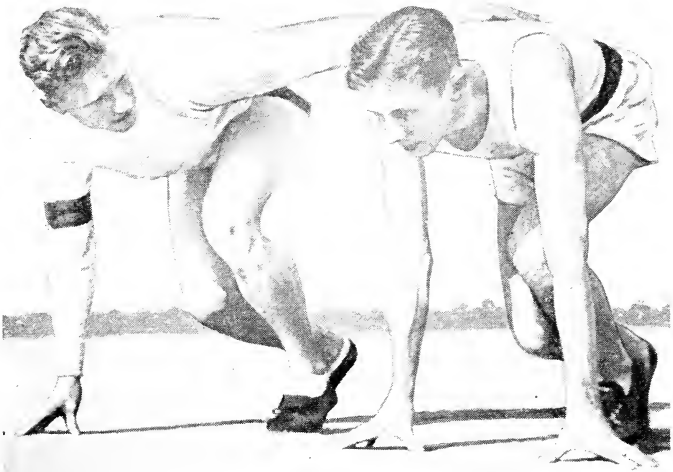
Only a few sprinters make full use of arm and leg action when coming out of the start holes and a great many of this class break away from the proper body angle. The majority of sprinters use running form, insofar as stride is concerned, rather than the short abbreviated mechanical knee and leg action. The wasteful high kickup behind is a prominent feature of this style, in itself a detriment to correct sprinting body angle. The final ten yards inevitably brings out a number of faults such as the shoulder shrug, body twist, lack of arm action, poor head position.

All of these mistakes can be remedied by close attention to mechanical form, and the first month of every season should be entirely devoted to their elimination. Finish faults are usually the result of forgetfulness, or a lack of mental concentration, and the maintenance of form at this stage of the race usually requires mental assistance.



(A) Illustrating a standard "knee lift" exercise. It is designed to encourage knee action rather than a "kick-up" behind delayed action. This exercise may be varied to advantage by raising the body upward so that when the body is fully extended, it will be supported entirely by the toes. The foot may then be thrown forward, as in an actual stride. This exercise aids the body balance as well as strengthening the leg muscles. The knee lift is a fundamental of mechanical sprinting and should be encouraged by a series of exercises, similar to those shown. (B and C) Two of Paddock's original exercises. These exercises are designed to encourage the knee lift as well as to make flexible and responsive the muscles that are used in this style of sprinting.

A sprinter will give a better exhibition of mechanical form when running against a slow field and will generally run in faster time. For this reason we often find a champion equalling record time on such occasions. Close competition, on the other hand, does not usually result in broken records, and we often find three or four sprinters, ordinarily capable of even time in the hundred, running one or two-fifths behind their usual time. The one hundred yards dash in particular requires a close attention to the small details, as the action is intensive to a degree that will not permit casual form unless compensated by exceptional natural ability. The furlong differs and, by reason of the added distance to be traveled, will permit a less skillful start action and does not place such a premium upon a quick-striding movement. For this reason many sprinters with stamina and strong striding action appear to advantage, in spite of minor sprinting faults.



Charles Paddock, world's fastest runner, demonstrating his getaway to Eddie Sudden of Stanford University. Both the champion and the Stanford sprinter are holding an exceptionally fine "Get set" posture. Note the downward drop from the knee to the ankle (both men have this well perfected). Otherwise both sprinters seem to be meeting all of the various points which have been stressed throughout this book, with the exception of Sudden's (on the right) hand position. Compare his hand position with Paddock's and the difference between the braced hand and the old style position can be easily discerned. This tripod hand position also brings the shoulders well up, which is an advantage. The usual novice has a tendency to raise the rear part of his body, whereas the back line should show a straight line or a slight upward raise (the shoulders higher than the hips). The footspread will vary these points somewhat, but, as a rule, it will be found that the recommended points of the start can be used with little modification by all types of sprinters. Both men are demonstrating the right sort of arm-spread and arm position. It is also interesting to observe that Sudden is not staring ahead toward the finish line. For this reason he is able to eliminate the strain that comes from that position. The novice will find it to his advantage to carefully study the position illustrated in this picture.

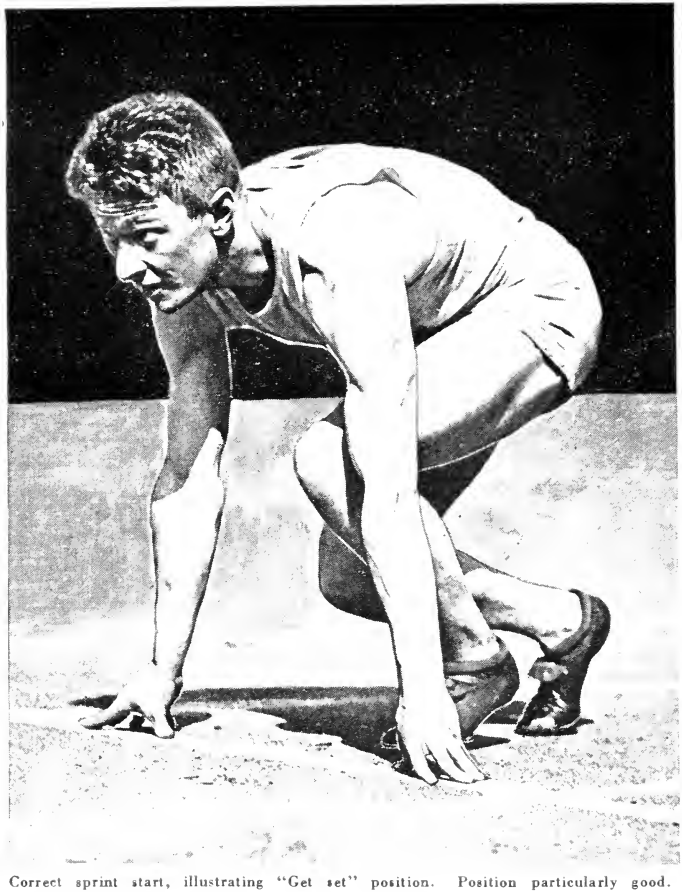
THE STARTING STYLE

The starting style which is advised embodies many of the generally accepted ideas in connection with the "crouch," with some additions which cannot do other than work beneficially. In most cases of sprinting there is too much uneasiness manifest in the starting actions of the runners.

This could come from incorrect starting methods or lack of confidence in the pistol firer, or both. Nevertheless, with either, or both, being the reason for the uncertainty of outcome seen in the wavering actions, it must be conceded that the men who as a rule leave the mark according to the best laid plans, are few and far between.

In the first place it is contended that the position of the hands of runners on the marks in nine hundred and ninety-nine cases out of a thousand is wrong. An investigation at this particular stage will show that the thumb and index finger are the nearest to the mark, with the other fingers in a row to the rear, and the whole hand invariably flat on the track, being of no real support to the arms.

That there is little or no support to be had from the hands in that position can be established upon trial. Inasmuch as the hands and arms are called upon to do an important work at the start in the way of support, it would appear that this was a factor in footrace starting which had been overlooked.

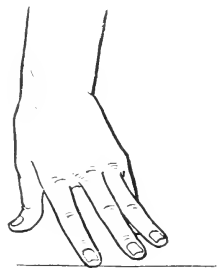


Correct sprint start, illustrating "Get set" position. Position particularly good. Hand is tensed and is well off the ground. Thumb and first finger are close to the start line and the other fingers form the recommended "tripod position." Both arms are fully extended and are tensed to sustain their share of the body weight. The distance between the hands gives the necessary balance and allows an easy subsequent arm and leg action. The rear knee is lifted to a height which allows the downward angle from the knee to the ankle. The back angle is also correct, the neck being the highest point. The front foot is approximately five inches behind the line and the rear knee appears to be opposite the middle of the front foot. The position of the head is a matter of preference. The athlete may look straightahead, as in the illustration, or downward. The head is well over the line. The absence of starting holes does not permit a criticism of the foot position.

(Loren Murchison, All-America 300 yards champion.)

It is suggested that the best position for the hands at the start is one in which the first two fingers are nearest to the line, with the thumbs and other fingers ranged further back, with the whole, in each case assuming a "tripod" position.

Right hand



Left hand

THE RECOMMENDED "TRIPOD SPREAD" HAND POSITION.

Demonstration will show that this placement is at once more powerful in its "propping" and deterring influences than the generally accepted custom. The hands and the arms are to be used as the forward "props" for the body, and the positiveness of the purchase on the ground of the hands in the position suggested argue for a lessening of the inclination to fall forward in anticipation of gunfire.

There should be no action, or accumulation of actions, which will tend to tense the muscles at the start or at any other stage of a sprint event. But it is safe to say that a large majority of sprinters are too keenly on edge during the starting process principally, because of the tensity occasioned by what appeals as the assumption of

H. Lever, University of Pennsylvania, Intercollegiate sprint champion. This "get set" pose is particularly good. With start holes it is probable that the sprinter would exhibit a better forward lean, but excepting this slight fault he is well poised for an effective drive. His arms are straight and it is apparent that they are holding up their share of the body weight. He is using a type of the recommended tripod hand position. His arms are spread to the desired degree. He shows a straight back line. Note the downward angle of the rear foreleg (from the knee to the ankle). It is permissible for a close-coupled starter to hug the start line and by the same reasoning it is reasonable to expect that a long-legged sprinter will drop farther behind the start line. This position will enable the starter to make the chopped "peck" stride which is an essential factor in the getaway.

a false position, i.e., the elevation on the ball of each foot after the "Get set" command is given.

The forward leg should be used as a prop to support the body when in starting position, with the rear leg and the hands and arms the deterrents when a too forward position is reached, in the event of too long a "hold" by the starter.

The rear leg must be just far enough back of the forward one for the runner to feel comfortable when in position. This can best be determined by the runner himself. As a general proposition it has been found that when the rear knee is brought up to the middle of the forward foot a good, easy position will be had.

Allowing that a proper position has been taken with both feet in position, the runner will be ready for the command to "Take marks." Naturally, he will adjust the rear foot first by placing it in the hole provided, which must be well supported at the back to prevent being pushed rearward.

Incidentally, this hole for the pushoff should be carefully dug, not too deep, but sufficiently perpendicular at the back to afford the proper push when the signal is given. The runner should take a small trowel to the mark, with which to dig the hole.

He then drops down in order to get the foreleg and hands in position. The hands can be placed from eighteen to twenty-four inches apart, just so that clearance could be made with the feet if they were to be brought forward without the hands being removed.

This will insure a comfortable position and make one ready for the command to "Get set." Immediately this is given, the runner brings his hips up in positive fashion

J. A. LeConey, Lafayette; illustrating the "On your marks" start position—Note that the intercollegiate sprint champion is using a short footspread, the knee of the rear leg being approximately even with the toe of the forward foot (the picture shows a posed position, hence the absence of start holes). Note the recommended arm-spread, the inside of each arm being just outside the outer portion of the leg. The hand position does not quite conform to the tripod finger position which has been recommended in this handbook. Many sprinters favor the style shown, as it allows the sprinter a slight advantage in that he can come up closer to the start line. Its disadvantage lies in the fact that it does not encourage the practise of putting an equal part of the body weight upon the arms (with the left leg) when the "Get set" position is taken. The position indicated could be improved by drawing the thumbs back and allowing the other fingers to go ahead, all of them taking a more spread position. The front foot seems to be about four inches back of the start line, which is the recommended distance, as every sprinter will slightly vary the average five-inch-behind-the-line position.

high enough to warrant the knee of the rear leg being a trifle higher than horizontal, and midway in height to the shin of the other leg.

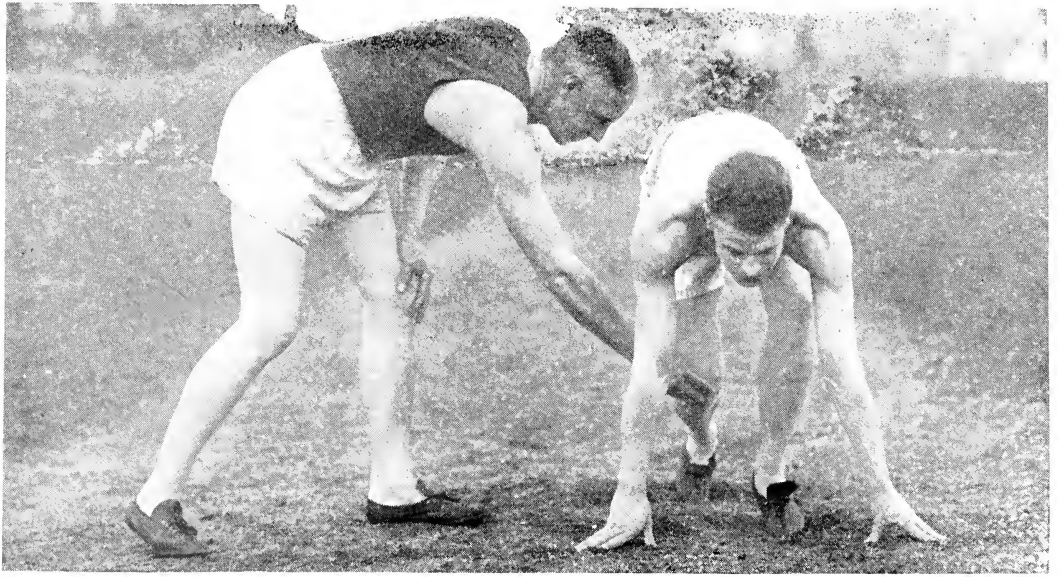
The pressure applied by the rear leg will permit a safeguarding of balance to be supplied by the arms, which, if properly used, will guard against the falling-over tendency.

Great concern should be felt about how the arms are to be carried when the runner has left his mark. The action which will make them conform to the leg action will be mechanical, and assisted by mental concentration. The arm action must be forceful, and of the forward and lifting sort which will aid in the demand of the will that he get into his running as quickly as is possible.

There should be no deviation to right or left of the rear foot immediately it is brought from its initial position. The runner must cultivate the habit of running straight from the mark, and he must learn just how far he should bring the rear foot forward in his first stride so as to put it in perfect balance for the second stride and an accumulation of pace.

A good start should make for a good ending, and the more uniform the first few strides are made for the purpose of generating the speed so needful in the early part of a sprint race, the better results the runner is certain of during the latter stages.

It being conceded that the runner is able to go through whatever distance he elects to sprint he must, or should, always do so in good form. He should not be "ragged" at any stage. If there is that smoothness of action so seldom seen, he will be able to show the form which should be his with the proper sort of application.



TWO GENERATIONS OF SPRINT CHAMPIONS.

Bernard J. Wefers, holder of the world's record for 300 yards (30 3-5 seconds) and co-holder of the world's record for 220 yards (21 1-5 seconds), until those marks were surpassed by Paddock's wonderful performances in 1921, instructing his son "Bernie." The latter, under the tuition of his father, now a noted coach, has made some remarkable times in sprint and relay events and was a member of the New York Athletic Club relay team that won the 440 yards and the 880 yards events at the Amateur Athletic Union national championships at Pasadena, California, in 1921.

He will maintain that form throughout and should retain the same running poise through the tape as at any stage of the race. "Race over the line" is the command to be given those sprinters who would pattern their style erroneously after some runners who, as a last action, make a dive at the finish line or a "throw" with the upper body, with the idea of breaking the tape in advance of all others. The average sprinter cannot ordinarily "throw" himself at a finish line without thereby increasing the period of suspension during the minute fraction of a second that it takes to change the position, but a fraction most vital in the result of the race. Curiously enough, however, a limited number of champions have adopted a running broad jump finish and in all fairness it must be admitted that these men won the majority of their races by reason of its usage.

In connection with starting what Arthur Duffey, the one-time holder of the 100 yards record of 9 3-5 seconds, wrote may be illuminating.

"The art of starting," Duffey wrote, "is conceded to be the most difficult part of sprinting to master. It is the most important element which enters into the exercise of running, and although realizing that a great deal can be said upon this necessary function, it is my intention to confine myself entirely upon the experience I have had in regard to my own manner of starting, known as the 'kangaroo start.'

"The crouching start has been now universally adopted by all athletes, both in this country and abroad. It is a revelation to the public, and also to many athletes themselves, that in starting from such a position how it can be managed so scientifically and with such prompt-

Howard Drew, co-holder 100 yards record of 9 3-5 seconds. Sprint start, showing "Get set" position. The form in this illustration differs slightly from that shown on page 56 in that the runner is using a greater handspread, which brings the upper portion of the neck to a lower position, with a consequent straight backline, whereas Murchison is using an average handspread, which automatically raises the upper portion of the back. The picture also shows that the front hole is more than the usual five inches behind the start line. The hand and finger position used by Drew when above was snapped is identical with the style which is in use by the majority of sprint champions. The "tripod" spread affords a greater degree of stability, however, and should be used in every instance. The sprinter must realize that each individual, by reason of varying height, weight and leg length, will adopt a comfortable start position rather than a standard fixed position; therefore he need only concern himself with the fundamentals of the form, even though his conception of the style differs from others in the matter of details.

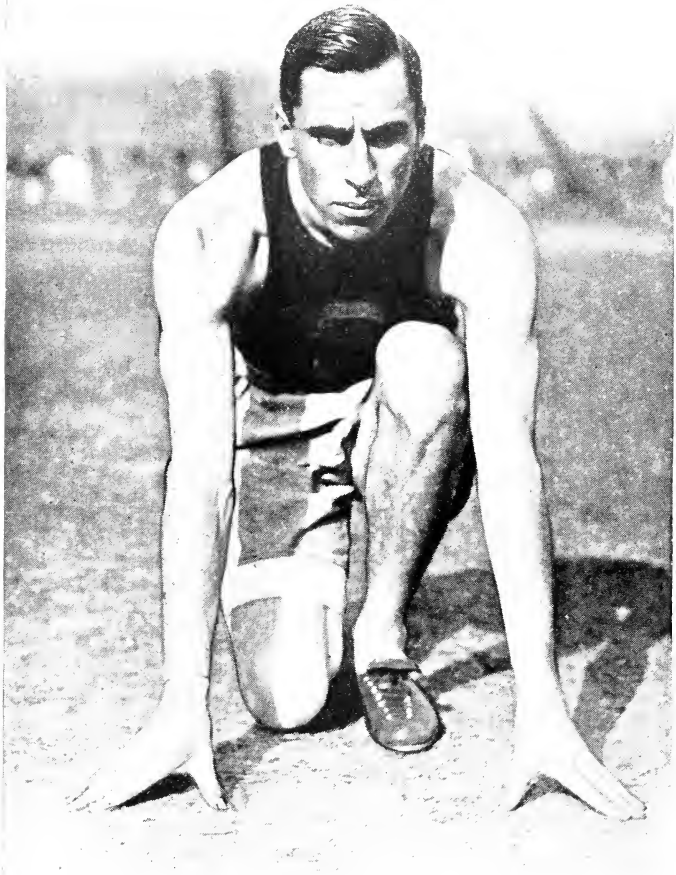
ness. A very simple illustration, which might help to inform the reader how such a crouch can insure such exactness, is in observing the cat, the tiger, or any member of the feline family. How noticeable it is that when any of these animals are about to spring for their prey, they assume a crouching attitude, which enables them to leap more quickly. So it is in sprint running, the athlete crouches—pulls himself together, so to speak—and calmly awaits the spring.

"Theoretically speaking, three things should be brought to consideration in order to insure the most accurate start. These three acts must be combined so that they all work simultaneously.

"First, the body should be well over the mark as far as the center of equilibrium will allow, so that when the hands leave the ground the body immediately will go forward. This is termed the 'fall.'

"Secondly, the weight of the body should be on the forward foot and arms. The foot should be about five inches from the line, and great caution should be used not to place the hands too far apart, just so the legs will pass between without touching. The back leg is principally used as a guider, which prevents the body from swaying to the right or left. It should be in a perfectly easy position, so when called upon it will respond actively. A good way to judge how far back this foot should be placed is by placing the knee of the back foot at the instep of the front foot. In indoor racing the back foot is placed just a trifle nearer than in outdoor racing.

"In many athletes it is a common fault that they do not use their arms to advantage. The arms should be



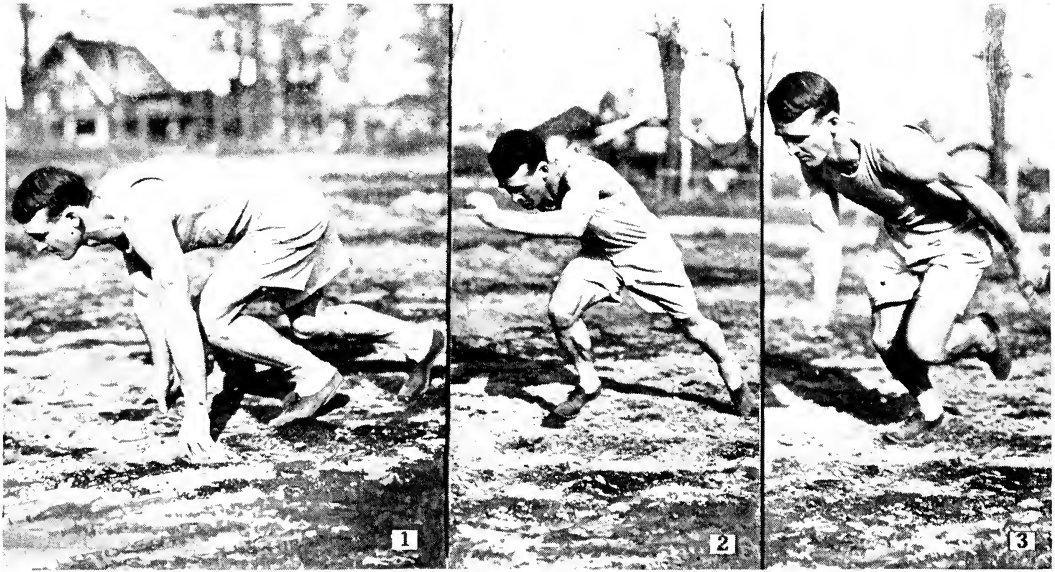
The sprint start, showing the "On your marks" position. The rear knee is even with the middle of the forward foot. The entire body is relaxed. Note the distance between the hands—a position that will give body balance and will allow a direct arm swing to the front and rear. (Maxam, University of Pennsylvania.)

developed just as well as the legs and other muscles of the body, as the whole secret of sprint running is the ability to call upon all the muscles of the body at the same time. How often you will hear remarked by the people unfamiliar with running that the only advantage gained by footracing is the development of the legs. Let me assure the reader that all the muscles of the body must be developed, and just as sure as there is an undeveloped muscle, it is certain to make itself known in the outcome of the race.

"A push must be cultivated by the left leg so the body will be driven forward. Both legs must be called into action at the one moment. This push is only obtained by conscientious starting, and gradually as the legs are exercised, the more powerful becomes the driving force.

"Thus having considered the theory of the start, the next consideration is the start in reality. At the command 'On the mark,' as it is generally termed in America the athlete approaches the line, has been heretofore explained, and assumes the crouch with perfectly easy posture. In other words, he should be resting upon one knee, hands upon the line, and calmly awaiting the next cautionary command. Immediately upon the latter word, he should strike the position known as 'Set,' and with breath held and the body poised well over the line, he should endeavor to call upon all the muscular and nervous force of the body.

"To a great many runners the position of the arms seems to be a difficult matter to overcome. In other words, they do not seem to know what to do with their arms as soon as the gun goes off.



No. 1 shows a proper "Get set" position. Observe the modified type of tripod finger-and-hand position, the well extended arms, the slight downward incline of the rear shin, the straightline back position, the easy head position and the forward lean. The muscular tension in the arms and forward leg proves that these members are bearing their share of the body weight. Note that the rear heel has not been drawn away from the slanting back wall of the rear hole. Most sprinters make this mistake when the perpendicular back wall is not used. No. 2 shows the first step out of the marks and No. 3, the second stride. In No. 2 it will be noted that although a natural step action is being used, it is not too long an effort for this athlete, as the angle of the two legs is almost identical. Note the full forward extension of the rear leg and the forceful arm action as well as the perfect body angle that is so evident. (Posed by Archie Hahn.)

"At the report of the pistol the left arm is swung directly ahead, flexed at the elbow, the right arm swinging directly backwards. This is an immense help to the start when mastered, and much time should be spent in the development of the same.

"To a number of runners, the first stride seems to be a very difficult matter to overcome with precision. It is necessary that the first stride be made in the proper manner, for if that is not made correctly it just delays the runner from getting into his speed.

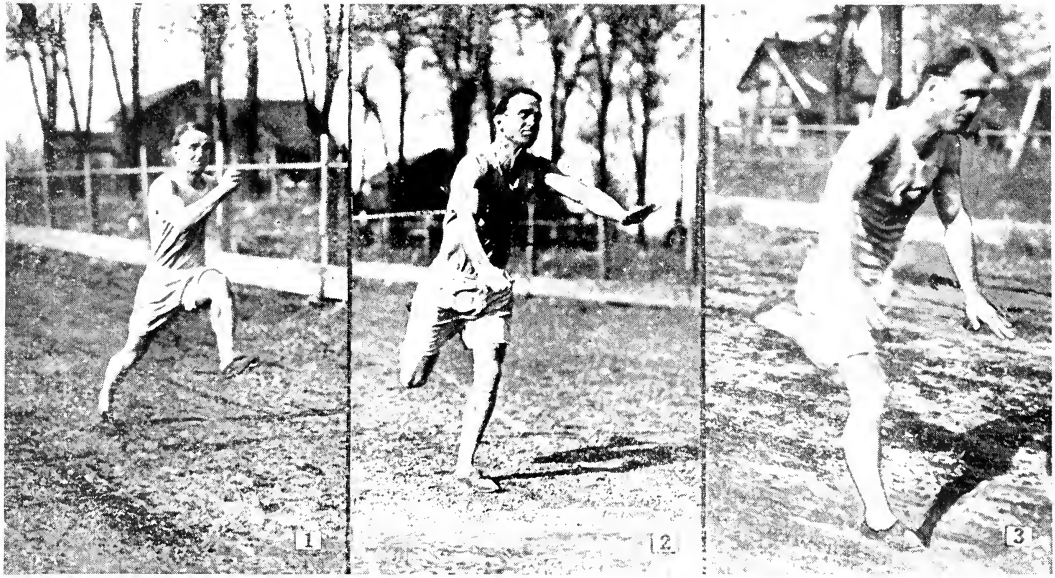
"The great secret in sprinting is being the first to get into the running. Therefore the reader should realize the necessity of the initial impetus. This movement is an upward and downward jabbing motion, thrown directly from the hip.

"Much time should be spent upon this important function as constant practise will develop the necessary rapidity of movement which will allow for a speedy followup of a more normal subsequent stride.

"Another important point which should be brought to one's attention is the necessity for forward action, by lifting the knees in a straight line and jabbing directly downward, without any of the side deviation which is such a common fault with the novice sprinter."

Relative to the "throw" at the finish, a somewhat sensational style successfully used by J. W. Morton, winner of the British 100 yards championship in 1904-5-6-7, his statement in relation to what was a onetime innovation is submitted:

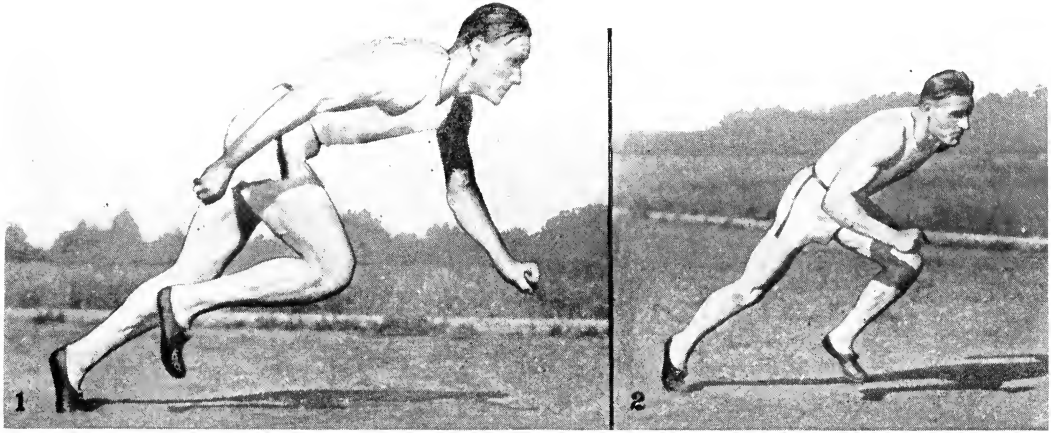
"After leaving the mark I pay no attention whatever to breathing, taking a breath as required. At about twenty



No. 1 shows sprinting action. It will be observed that the athlete is using a fine body lean, that his rear leg is fully extended and that he shows flexible hip-and-knee action. From this position either a chop-down—partial or full—can be used or a full stretch stride. The clenched hand and tensed arm show that the legs are receiving full co-operation. Note the position of the forward fist. It is also interesting to note that the natural shoulder position is being maintained in spite of the obvious effort that is being put into this practise sprint. The head and, in fact, the entire inactive upper section of body are doing their share by holding to a natural pose. No. 2 shows the "throw" finish and No. 3 the action beyond the finish line. It will be seen that this "throw" action does not necessarily call for an upward thrust of the arms. The maintenance of forward body lean is admirable. This may be called a straightahead "throw," as the body is not thrown out of alignment. (Posed by Archie Hahn.)

yards from the tape I take a long breath, quickly pulling myself together for a final effort. At this point a thrill seems to pass through my muscles; I travel much faster and, should it be a close finish, at about eight feet from the tape I throw myself off the right leg, striking the tape with the left breast, and saving myself from collapsing by the left leg. Should your stride have left you on the other leg at this period, your method will, of course, be vice versa.

"It is advisable to practise this method of finishing on grass, as you will be able to pay more attention to it, not being afraid of the abrasions that a fall on the cinder track would cause. Whatever you do, do not attempt too long a throw to the tape, and do not attempt to bring the feet together like in a long jump. To be successful with this jump at the finish the runner must get off one leg."



Leonard Paulu, Grinnell College, winner of Iowa State, Missouri Valley and National Collegiate A.A. championships, 1920.—Illustrating the first and second stride out of the marks. Note that the front start hole is close to the starting line and that a close footspread has been used (judged by position of rear hole). The outstanding feature of both illustrations is extreme forward body lean and the fully extended rear leg. The majority of sprinters evidently find it impossible to let themselves go forward to this extent. (1) This pose could be bettered by using a more exaggerated arm-swing ahead and to the rear and by emphasizing the knee lift. The last named point is also one that is much slighted. As in actual sprinting, the forward momentum is regulated by the force of the foot impact, or downward leg drive. This is particularly true when the real shortened foreleg stride is used. When a full natural running stride is used it does not have the same importance, as a pulling-forward action is used instead of a downward drive. (2) An even better angle is shown in this picture. The right forearm and hand could be lifted upward beyond its present position to advantage. The length of the first, second, third or fourth stride cannot be arbitrarily fixed, because it will vary with the length of the sprinter's legs. The correct stride length should be determined by the angle of the foreleg and the body. This can best be explained by studying the body and forward leg position of the figure in the illustration. Note that the foot is well behind the knee and that the angle from the knee to the ankle is the same as the body angle. The foot is jabbed downward at this stage and is never stretched ontward, as this would cause an overlength stride which would slow up the action and tend toward an erect position.

STARTING INTRICACIES

Preparation for sprinting after all the preliminary details in connection with the attainment of proper form have been mastered should begin with the solving of the intricacies of starting—ability to get away from the mark, out of the holes, etc.

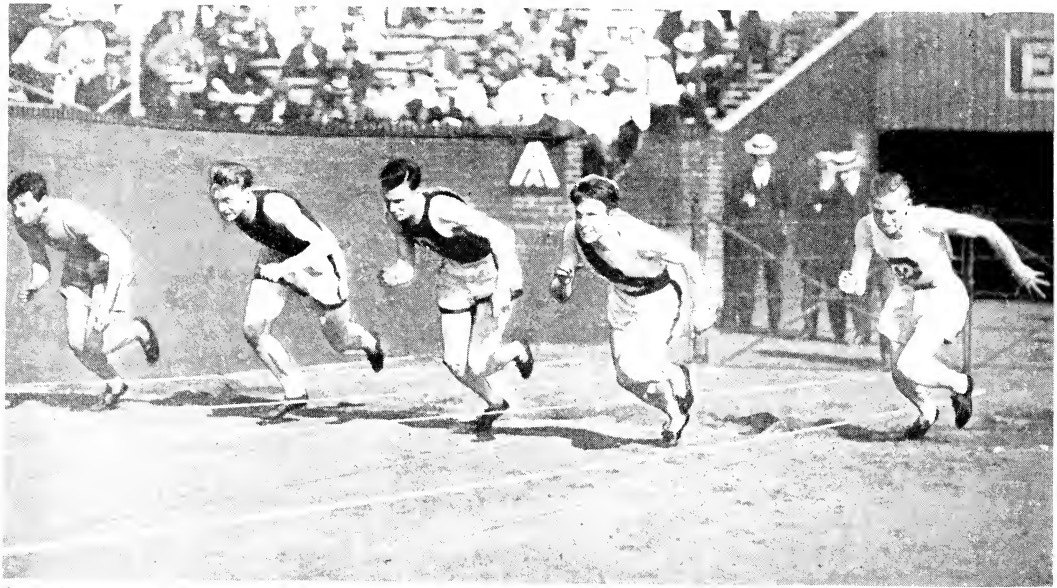
In sprint running the knack and ability to go "away from the gun" is a strong point in favor of the athlete's success. Some men are particularly adept in leaving the mark, and the advantage gained, even though it be but half a yard—just a fraction of a second ahead of the other fellow—invariably spells victory when there is little to choose between runners in the matter of speed.

There is an unknown something which gives the man who gets away from his mark quickly an advantage over a slower "mover" which cannot be offset unless the latter is considerably the better man.

There are runners aplenty who manage to get away well but whose running form is such that they quickly lose any advantage which may have accrued through the ability to be fast "out of the slips."

This is the trait which is warranted by the response of the muscular system to the call of the will as demanded by the brain's telegraphy upon the sound of the starting pistol.

It is because some men more quickly respond to such a call—the instantaneous action caused by a perfect co-ordination between the sense of hearing and the will to release the muscular action—that warrants one runner



Start of 100 yards run. From right to left: E. C. Cornet, Cornell; R. B. Thomas, Princeton; C. O. Olson, Dartmouth; M. E. Robinson, Syracuse, and H. H. Jacobs, Columbia. Cornet is getting a late start and is seen coming out of his marks for the first stride. His left knee is pointed in toward the right leg, whereas it should be lifted up to a greater height and straightahead. His right arm is coming out in good form, but his left has been thrown to the rear and away from the body instead of directly to the rear. His body angle is good. Thomas has taken a correct abbreviated first stride and is coming into his second. Note that he has retained his body angle and that his left knee is coming up in the proper fashion. His arm action is also correct. Olson is using a slight kick-up action with his left leg, whereas the knee should be lifted directly upward, thus eliminating the kick-up behind. The left elbow should be farther to the rear as he is bringing the left knee up for a second stride. Robinson is not emphasizing his left knee action to a sufficient degree, as his left foot has too much elevation. Jacobs' lack of knee action is also noticeable. His arm action is also faulty, as both arms are in front of the body, whereas his right hand should be well forward and his left elbow should be an equal distance to the rear of his body. The forward arm swing during the first two or three strides should be especially emphatic.

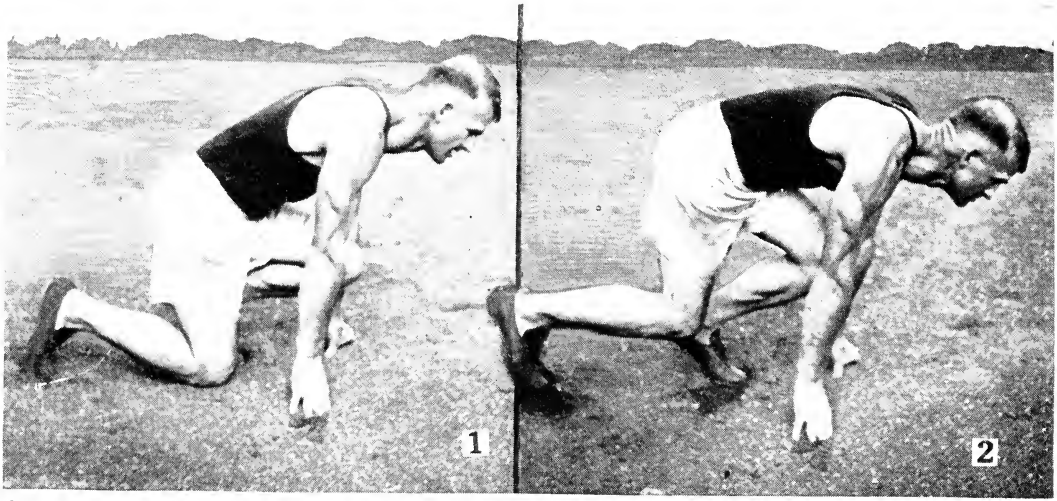
in being quicker in getting away than another who is not so strongly endowed with such a necessary trait to success in sprinting.

Just as some men think quicker than others; just as some men can be relied upon to time more correctly than others because of the absolute dovetailing of their sight and touch impulses, just so is the runner who has in his makeup that ability to bring together an uninterrupted succession of movements, from the time he hears the pistol until he gets his rear foot out of the hole, going to show superiority in the art of sprint starting.

How often is the runner seen who makes that infinitesimal pause between the command of the pistol shot and his plunging effort at leaving the mark. Here is seen the hesitancy which sometimes makes for the difference between a great sprinter and one who might be called a good performer.

Of course, this hesitancy can result from wrong starting methods in combination with the indecision exhibited by the pistol firer who does not know his business—and the latter's number is legion.

Furthermore, a starter who does not know his business will keep men on their marks until they do not know whether they are coming or going, or else he will "fire them off" to save his incompetence from being too plainly noticeable. In any event he gets them "on edge" and almost ready to take any sort of a chance to "beat the gun," if possible.

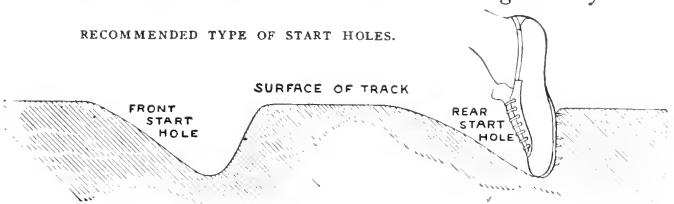


No. 1 shows an easy "On your marks" position. This position includes a forward lean that is ordinarily only seen in the "Get set" position. Many coaches favor this plan, as it often is an advantage in competition. To complete his preparation, the sprinter need only raise his knee from the ground. In the orthodox method the "Get set" position includes the forward lean. No. 2 shows the "Get set" position. The athlete is using the recommended foot-spread as his rear knee is approximately opposite the middle of the front foot. An approximate five-inch distance spread between the front hole and the start line is also in evidence.

(Posed by Archie Hahn.)

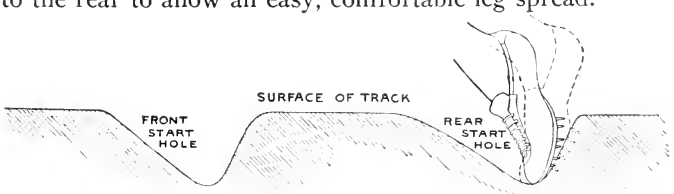
STARTING HOLES

With a trowel or similar instrument the forward hole should be carefully constructed deep enough to provide a firm seat for the ball of the foot. It is made in two ways—with a perpendicular or straight up-and-down back wall and with a semi-slant. The latter is more generally used.

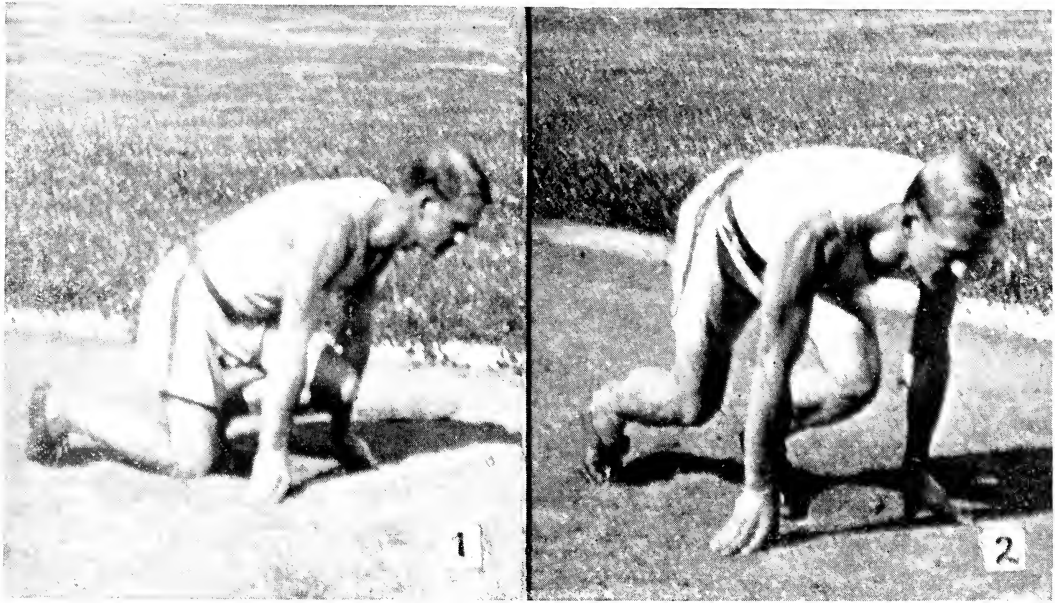


Perpendicular—or nearly so—back wall of rear hole. Both holes should be of sufficient depth to allow a firm contact of ball of foot and firm grip of all spikes. The advantage of the perpendicular wall will be more apparent to the runner when he takes the "Get set" position rather than on the initial one of taking his marks.

The forward hole is generally placed about five inches behind the starting line. This will vary according to the type of start used by the sprinter. The rear hole should be slightly to the right of the forward hole and sufficiently to the rear to allow an easy, comfortable leg spread.



In assuming a correct "Get set" position, there is always a tendency to draw the rear heel forward, because the upper part of the athlete's body should lean over the start line. When the back wall is inclined too much, as shown above, in order to get purchase or drive-out impetus, the foot is obliged to go back to the dotted shoe position before the start can be made, thereby adding an extra movement, with consequent lost time.



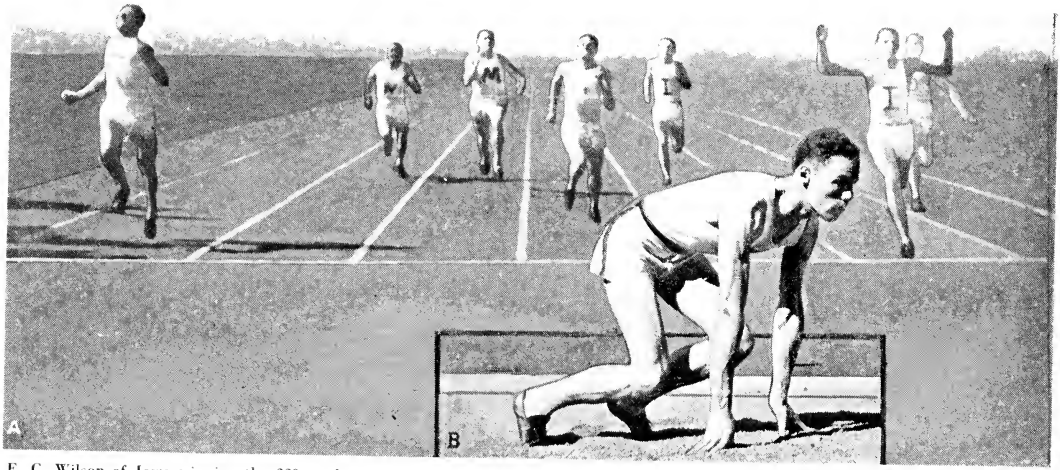
This is a duplicate of the starting action shown on page 76, photographed from a different angle. No. 1 shows the "On your marks" position and No. 2 the "Get set" position. In No. 1 the athlete appears to be using a closer foot-spread, for his rear knee is opposite the toe of his forward foot. This is the recommended position for a close-coupled runner. No. 2 shows an exceptionally fine "Get set" position. It can be seen at a glance that the sprinter is actually poised for an advantageous start. In other words, the athlete is not taking this position because it is a conventional position but because it assists in getting under way with a minimum loss of time. Observe all of the recommended points—spread and position of arms, forward body lean, semi-tripod hand position, back angle, angle of rear shin, head position. **(Posed by Archie Hahn.)**

"ON YOUR MARKS" POSITION

The sprinter should step easily into the marks and come to rest on the knee of the rear or right leg. The exact footspread is a matter of controversy and should be determined by each individual athlete. The old style start called for a position in which the rear knee failed to come up even with the front heel. Recent start methods approve a position in which the rear knee is even with the heel of the forward foot or the middle of the foot.

Advocates of a close-coupled start recommend a position which allows the knee to be placed even with the middle of the first foot, or as far forward as the toe of the front foot. A short, quick-striding novice undoubtedly can use the latter style to advantage, but a long-legged sprinter will do well to follow the more conservative method, if a comfortable position is desired.

The short footspread has one advantage over the long spread in that it allows a quick striding action out of the holes, the knee of the rear leg simply being lifted upward and downward for the first chopped stride action, whereas the long spread requires a forward action, the length of which will vary with the footspread, before the knee can be brought up to the necessary elevation. It is necessarily slower in point of time. If care is not taken, however, the short footspread will produce an upward bolt rather than a forward movement.



E. C. Wilson of Iowa winning the 220 yards event at Western Conference meet, 1921; Hayes, Notre Dame, second; Simmons, Michigan, third; Moorehead, Ohio State, fourth; Hulthkrans, Minnesota, fifth.—The second picture shows the conventional start position. Although a number of successful champions have used this start style, it fails to check up in one particular with the recommended position. Note the distance between the left foot start hole and the start line. It is difficult from this position to put into effect the right knee lift with any degree of speed. When the conformation of his body permits, the athlete should always assume a position close to the line; the five-inch distance recommended is a happy medium. If this change were made it would tend to lift the left knee to a higher level and to the standard position. The fingers should be spread according to the idea presented. The neck should assume an easy relaxed position, which usually calls for a facing-downward-and-ahead position instead of directly ahead. However, the individual style should be retained if it gives satisfaction, particularly if it has become a habit. The novice, however, is urged to carefully try out the recommended position before any individual style is adopted. In all fairness, it must be admitted that each form change has been forced into popular acceptance through its use by some successful thinking pioneer and for this reason each individual should not adopt a set form, no matter how successful it may have been with some athlete, unless it also meets with his own approval. He must, to use a trite term, sell himself that particular idea.

THE "GET SET" POSITION

When this command is given, the sprinter should assume immediately a tense position, sustaining his weight by the hands, arms and forward or left leg. As has been explained, the rear leg and foot merely aids in the maintenance of balance. The arms should be placed far enough apart to allow a free forward body action. If the hands are not separated to a sufficient degree an uncertain balance will result. If too great a spread is given, it will tend to hold the body too close to the ground, as the height of body elevation is gained by holding the arms and hands in a straight, tense position.

Many starters lose this straight-arm-and-hand position by bowing the arms outward at the elbows, or by letting down on the palms of the hand.

The rear knee should be lifted off the ground to a height that will allow a slight downward angle from the rear knee to the foot and the same slight drop from the neck to the back (this position will vary with the individual).

Care should be taken to sustain the weight of the body by the fingers, rather than the upper portion of the hands, so as to maintain the tripod spread already described. Most sprinters fail to take advantage of this point. The body should also be brought forward to a point that will bring the head well over the start line. While in this position, every faculty should be on the alert to ancicipate the gun report.

Carmen Smith, University of Wisconsin, co-holder 220 yards Conference record.—This pose approximately conforms to every rule by which starting is judged. Any slight deviation from a set rule does not necessarily detract from its effectiveness. For that matter we do not often find two athletes, each having perfect form, of the recognized type, performing in the same identical fashion. This is due to physical variation. Note the straight-line effect from the heel of the rear foot to the back of the head and the extreme forward lean. This position is the result of a vigorous arm-swing to the front and rear, a "letting go" of the body and a driveaway action on the part of the left sustaining leg. Lacking a proper arm-drive it would be impossible for the upper body to take a position from which the left leg, now to the rear, could take up the action. The proper knee lift and abbreviated first stride action are plainly shown. A longer stride would tend to produce a more erect position, and certainly would spoil the body angle. A fully extended forward arm-stretch will slow up the return action and often creates too much falling-forward action. This danger must be avoided as well as the tendency to bolt upright. This arm extension is reduced as the normal stride is resumed, that is, with each increased length stride. The second stride calls for the same high knee action and the same chopped stride. The added impetus will tend to slightly increase the length of the second step. The novice sprinter should carefully study the action of this photograph.

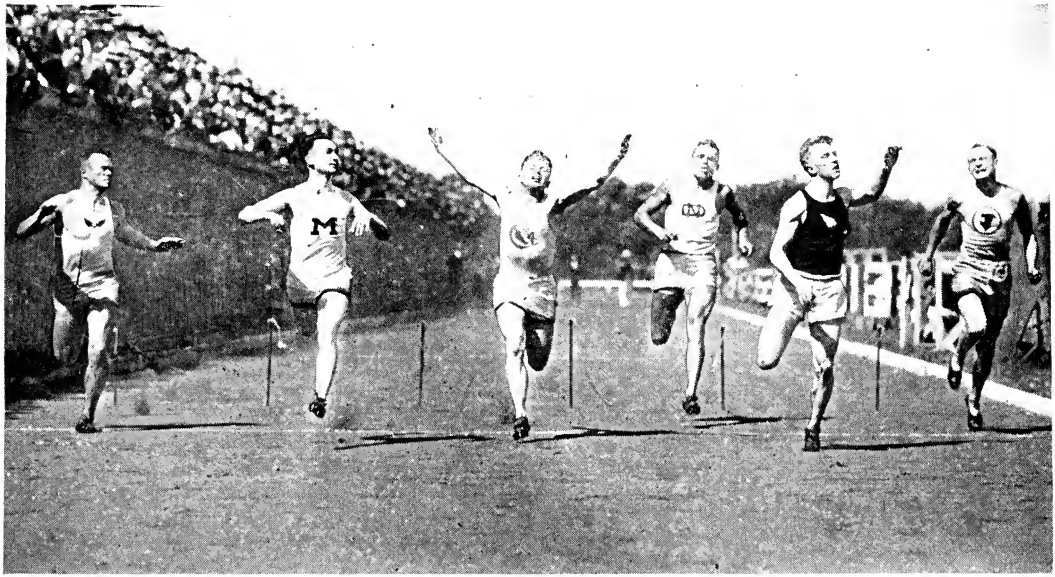
THE FINAL COMMAND OR GUN REPORT

The body is propelled forward by a vigorous pushoff of the left leg and is aided by the left arm action, which goes forward vigorously in an upward forward movement, but partially flexed at the elbow, as in an uppercut blow in boxing. If the arm is fully extended, it tends to prolong and accentuate the "falling forward" action. The right foot should be held firmly against the rear perpendicular wall of the hole prior to the final gun and should now be lifted upward and forward, assisted by the knee action (a sort of lifting push).

It should be remembered that the first stride is short and chopped; therefore, as soon as the knee has reached the proper elevation, the foot should be jabbed vigorously downward. No attempt should be made to swing the foreleg and foot outward for a stride attempt, for if this is done it will tend to rob the starter of the extreme body angle which is necessary at this point.

The right arm, which has been thrown directly backward, to the side, slightly flexed at the elbow, will come forward with the left leg action, as it succeeds the right leg action, after landing. The forward swing of this arm is also made with a flex at the elbow, so that full extension will not slow up the return movement.

The second stride will be considerably longer, and is designed to allow an almost normal third stride effort. The leg and knee action should be of the straightahead type and the hands and arms should follow the same



Finish of 100 yards run.—Loren Murchison, New York A.C., winner; J. V. Scholz, University of Missouri, second; Charles W. Paddock, Los Angeles A.C., third; M. M. Kirksey, Olympic A.C., fourth.—This finish is a typical one and indicates a general tendency to ease up at the tape. The runner on the extreme right has retained his running angle to a greater degree than his competitors and his position indicates perfection of knee and leg action. His arm action, however, is of the type used by middle distance runners rather than sprinters. His left hand should be raised toward his shoulder and the right hand should never go behind the body. A sprinter should allow his elbow only to go to the rear, while the hand describes an arc from the chin or shoulder to the hip or side of the body. The other contestants are kicking up behind with the rear leg to a noticeable degree. It is inevitable that every sprinter will kick up behind to a certain height, but if this tendency is not curbed it will tend to slow up the action. There is also a tendency on the part of all sprinters to exaggerate the foreleg stretch, although it must be remembered that a certain amount of it is necessary if a substantial stride is to be effected. This foreleg stretch is always counteracted to a certain extent by the forward momentum.

direct route, just missing the side of the body in the forward and backward swing.

This form is not universally used, as a few prefer a cross-arm motion in which the left and right arms are thrown diagonally across the chest, which produces a pacing action. Those who use this method have a tendency to run in a more or less upright position and in reality gain the bulk of their power from their legs. Howard Drew was an excellent excellent example of this type of form. Arthur Duffey also recommended the same style. The majority of champion sprinters, American and British, use the straightforward arm swing. The fact that a certain champion, or group of champions, used a certain style should not influence a novice to a degree that will prevent his making the necessary personal experiments.

The novice must learn to discriminate between the uppercut three-quarter arm extension arm swing that is a fundamental of "coming out of the start holes" and the abbreviated downdrop action of the sprint proper. As soon as a runner is in his stride, the forceful upward swing is abandoned for the down-chop, during which the arm is tensed. The muscles relax as the arm is *lifted* in a somewhat elliptical swing to the "opposite-the-shoulder" position. This down-chop in itself is an aid to the proper body lean. The swing-up throws the body off balance and tends toward erect running.

Joe Loomis, former National champion. Perfect body angle. Note the straight line effect from the rear heel to the back of the head, the full extension of the rear leg, the foot position and the knee lift. A lack of body angle or erect or semi-erect running, will handicap a track athlete in proportion to the lack of this vital fundamental. Many sprinters use a fair amount of this forward body lean when coming out of the marks, but immediately abandon it as soon as they are well under way. It is true that the extreme forward lean is modified with the first four or five strides but the running angle for the race proper is approximately the same as shown in the illustration. Sprinters involuntarily adopt a long stretch stride and a more erect position when running in the 100 and 220 events but hold to a true sprint form when covering shorter distances. On the contrary, sprinting form should prevail in all races up to the 100, possibly up to the 150 yard mark. Beyond this it is permissible to insert or combine with the sprint style, a sprint stride action. Note the right arm position. Although the arm perhaps is flexed to an unnecessary degree, thus bringing the fist too close to the body, it is approximately of the recommended style. From this position the hand and forearm can be chopped downward with maximum force and quickly, if too long a swing is not made. Only the elbow should go to the rear of the body. Fast driving leg-and-arm action is the secret of sprinting.

LEG ACTION

In combination with the acquisition of the correct carriage of the body and arms, the leg movement becomes an all-important consideration. Proper leg action imposes on the runner the necessity for a dovetailing of movements which must fit in perfectly as one of the cogs to the "engine" of the human machine.

The knees must be lifted just high enough to warrant their position in forming with the body an angle of the acute type. When the knee is brought up at the beginning of the stride, the body poise will be such as to make for a "falling forward" movement. This will demand a necessary straightening out of the foreleg for the completion of the stride.

Great care must be taken toward the perfection of the foreleg action. In this is contained the ground-gaining elements, together with the desire for increase of stride without an unnecessary expenditure of power.

On the other hand, the runner must be mindful of the need for striding just right. Care should be taken to cut off a certain amount of the outward foreleg stretch, otherwise the landing foot will get ahead of the body and the necessary running angle and traction will be lost. On the other hand he must avoid "cutting off" the effort of the foreleg by pulling it too soon, or before the whole striding effort has been completed.

He will expend as much power in "cutting off" his stride as if he were getting value received for the effort. This false action will warrant a greater number of strides

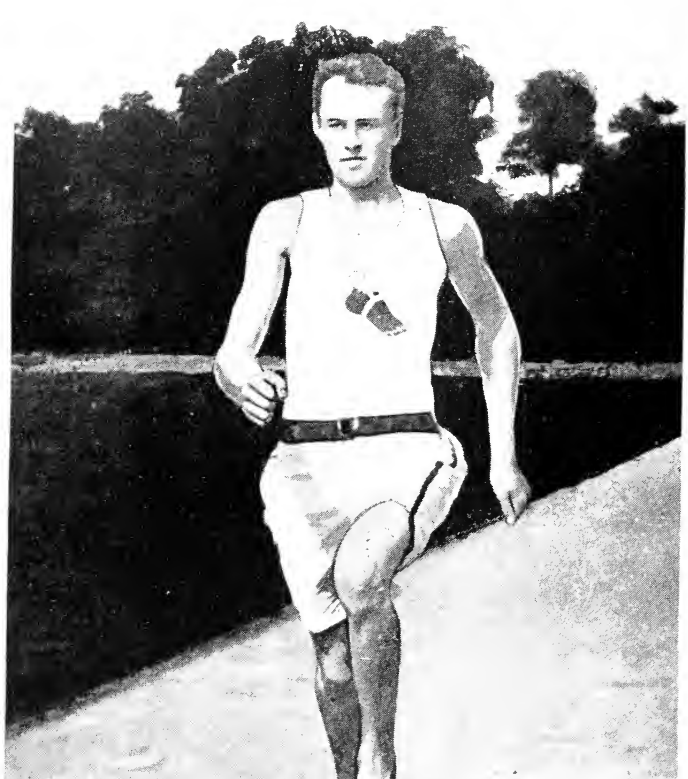
Allen Woodring, Olympic 200 meters champion. Woodring's form, from the waist down deserves a close study, as is it illustrates perfect leg and foot action. The right knee has been lifted directly upward and is pointed directly ahead; the rear, or left leg is fully extended and it is evident that perfect body angle is being maintained, so that if a line were drawn from the heel to the head it would reveal a straight line between those two points, with the necessary forward angle. This may be verified by laying a ruler, a sheet of paper, or any straight edge on the figure to get the idea. Sprinting body angle demands that the upper portion of the body be well over the landing foot at the time of landing. The picture bears out this statement. The runner is landing well up on the ball of the left foot, which is pointed directly ahead. His arm action is not entirely suitable for sprinting, being more of the type used in easy striding.

being taken for a given distance than will be found to be the case if the full benefits of proper striding are obtained.

He must place the feet on the track straight ahead—that is, he should receive all the benefit to be obtained through the spring, which is guaranteed when the stride is made with all of the toes aiding the ball of the foot in its movement.

He must learn to run straight and true. This feature can be fostered through the medium of line running, with the feet alternately landing on either side of a line drawn for the purpose.

The straight style must be maintained from the moment the "mark" is left behind. There must be no swerve to right or to left. The runner must come away from his mark "straight," and not with the feet six inches or more to the side of a line which marks a straightaway path.



B. J. Wefers, former world's 220 yards sprint champion, and father of B. J. Wefers, Jr., shown elsewhere in this book, and now a noted coach. Wefers' style was the perfection of stride and is well worth study by present-day runners.

STRIDE ACTION

Sprinters often realize the value of a quick pickup or fast leg action, but underestimate the value of the downward movement which may be stretched outward, after the fashion of middle distance running, by allowing the foot and foreleg to go out to the front for an additional stretch, after the knee has been brought upward to a fair elevation, or by snapping the foot and foreleg downward and behind, after the knee action.

The latter method will aid the maintenance of the necessary body angle and if performed vigorously will add a considerable amount of traction and forward momentum. The former will tend toward erect running and a more or less flatfooted landing effect, although it adds considerably to the length of the stride.

The latter style is the preferable one, but care should be taken not to cut down the stride length to a degree that will prohibit a moderate stretch. The force of the downward shove and upward shove of the foot and leg will propel the sprinter ahead and allow a very fair stride length when running at full speed. This is particularly true of the sprinter who makes full use of his arms in conjunction with the leg action.

It must be apparent to any novice that the kickup behind is wasteful in that it requires additional time and energy, as opposed to the knee action stride which simply lifts the leg upwards from its full extension to the rear and, when traction and elevation has been obtained, jabs it down again.

LeConey of Lafayette, Intercollegiate sprint champion; illustrating stride action—In this particular picture, the form shown is subject to the following criticisms: 1. The position of the arms indicates that the runner is depending largely upon his legs for his speed and that he is only according his arms a minor part in the general effort. In striding, the hands should be brought up to a higher position, usually to a point midway between waist and shoulder. In sprinting the hands go still higher, and at no time should they be lower than shoulder (or slightly under) height. The arm is flexed at the elbow, to a greater degree in sprinting than in striding, when the hand goes farther ahead to harmonize with the leg stride. 2. The sprinter is leaning well forward, but the lean comes from the waist rather than from the rear leg. This can best be checked up when the sprinter or runner is caught with the rear leg still on the ground, prior to the start of the stride, but the general position of the body, legs and foot will also bring out the lack or presence of body lean. In full speed striding, the angle is apt to be straightened, as striding is primarily an exerciser to strengthen the leg muscles. Hence, the lack of body angle is not as serious in this department as it is in sprinting. It is principally mentioned to prevent the novice from getting the wrong idea.

THE ARM SWING

In its relation to running, this particular effort takes on all the importance of the piston rod to the driving wheels of a locomotive. When properly executed in the forceful manner necessary, it is as productive of benefit to the user as is the correct use of the arms in boxing, where the short inside hook with either arm is effective in that it invariably finds a landing place on an opponent.

While the sprinter's arm swing is not altogether of the "hook arm" type, in that the latter is a movement nearly perpendicular, it is a close kin so far as forcefulness and real action are concerned, and necessitates a movement which can be best described as a three-quarters forward motion.

It is the exaggerated arm action of the street pedestrian when he is on exercise bent and swinging along at a twelve-minute to the mile pace (try it and you will find it requires some arm swing), being comparable in that the movement is there without the forcefulness necessary in sprinting.

The arm swing is a phase of the human mechanical action which is very much needed in running, the importance of which is generally overlooked.

It can govern the rapidity of the pickup and the length of the stride in a manner which makes for the sort of progress desired and, when properly mastered, is a factor which makes for a continuation of the carrying through of a form which stands one in good stead when one is at the end of the tether as regards the necessity for the further expenditure of leg action.

(A) Charles Paddock at the fifty yard mark, showing his harmonious arm and leg action. Paddock's success can be attributed largely to the tremendous impact of each stride, supplemented by an extremely vigorous downward drive. Note the upward knee lift, his forward body lean and his direct arm-and-leg action. His right arm swings straight ahead, while his left arm goes directly to the rear. An approximate "opposite-the-hip" and on a "level-with-the-shoulder" hand position is taken with each forward and backward swing. (B) Illustrating easy running action rather than sprinting. Paddock's leg power was a big factor in his record breaking performances; yet he could not be described as being exclusively a leg runner, because his upper body (torso) was called upon to do its share, too. This particular picture shows Paddock's wonderful lower leg development. A slight kick-up behind is in evidence.

How often have those who have attended athletic meets —being possessed of a critical eye—seen sprinters using "get there" arm swings which nullified perfectly good pickup and strong striding. These latter would have helped produce superlative performances had the upper body movement harmonized with the leg action.

How often have sprinters been seen "fighting" themselves with arm swings which "got them nowhere" but really acted in curtailing the length of their stride because of incorrect body carriage, coupled with a pumphandle arm action?

The arm swing for sprinting which is advocated demands the use of a movement in which the fists are brought to the front in an uppercut swing, which ends just lower than the chin in the forward action, while the backward swing warrants the hand in being a trifle back to the side of the hips as the result of the rearward movement.

Naturally, the swing must dovetail with the rapidity of the action of the pickup, with the weight distribution of the upper body so placed as to get value received for the result of the effort expended.

It goes without saying that as in most cases of physical endeavor, the easiest way is the best. It is a certainty that the co-ordinated movements outlined will go farther toward getting results for those who acquaint themselves thoroughly than will be found the case when the usual slipshod methods are employed.

Sprint finish, 220 yards run. Charles W. Paddock, Los Angeles Athletic Club, winner; M. M. Kirksey, Olympic Athletic Club, San Francisco, second; L. A. Murchison, New York Athletic Club, third; L. W. Messengale, University of Missouri, fourth. The style of the latter, based on accepted standards, is subject to following criticism: First, running in an erect position; second, relaxed at finish line instead of running at full speed for an approximate additional five yards; third, has landed flat-footed; fourth, has turned toward the winner rather than looking straight ahead, fifth, left knee is pointed toward the left, in place of straight ahead, and left foot is kicked up behind at too great a height. A. Woodring, in fifth place, is running vigorously and in good form save for a slight loss of running angle from the waist upward; a lack of abbreviated arm action is also noticeable. Paddock is finishing in easy style. Kirksey is fighting for a place with unabated speed and Murchison is using a full stride action rather than sprint form. The latter two are using a full foreleg stride, which tends to produce an upright position as well as a wasteful kick-up of the rear leg and foot, unless it is counteracted by a distinct forward body-lean. The foreleg should

THE 100 YARDS DASH

No pace judgment is necessary in this event, as it is run at top speed from start to finish. A finished sprinter can judge his position without turning his head to one side or without letting up in his efforts to get across first.

The first fifty yards is usually covered without particular concentration upon any one point, other than getting there. From that point on, the effort becomes a strain upon the body and if the sprinter is not careful he is apt to lose his proper form. He should therefore concentrate upon his arm and leg action and body angle, even though he is passed at this stage of the race.

This factor becomes increasingly important as the race nears its end, as the increasing physical demands are apt to offset the mental effect, and lost form will result. The sprinter should breathe through the mouth as well as the nose when running his race. Many track athletes assist the breathing action by expelling the breath violently, with a grunt. This often assists in the general effort, being timed to fit in with the downward arm action. Never attempt to run the 100 yards "with one breath"—a figure of speech. Many races are lost at the tape. The sprinter, therefore, never should slow up his action until the tape is well behind him.

The finish judges, in event the race is close, are apt to select the man who *appears* to be ahead just after the tape is broken. A sprinter will unconsciously lessen his speed if he does not run to an imaginary point beyond the finish at top speed, regardless of his position in the competition.

Howard P. Drew of the University of Southern California, equaling the world's 220 yards record in 1914; time 21 1-5 seconds. Drew ran a remarkably fast 150 yards in this event and finished out the race with an easy stride action—coasting the last 50 yards, as is indicated by his lack of body tension. It is evident that he could have bettered his performance by a considerable fraction had he realized his fine condition. His nearest competitor was capable of running the distance in 21 3-5 seconds.

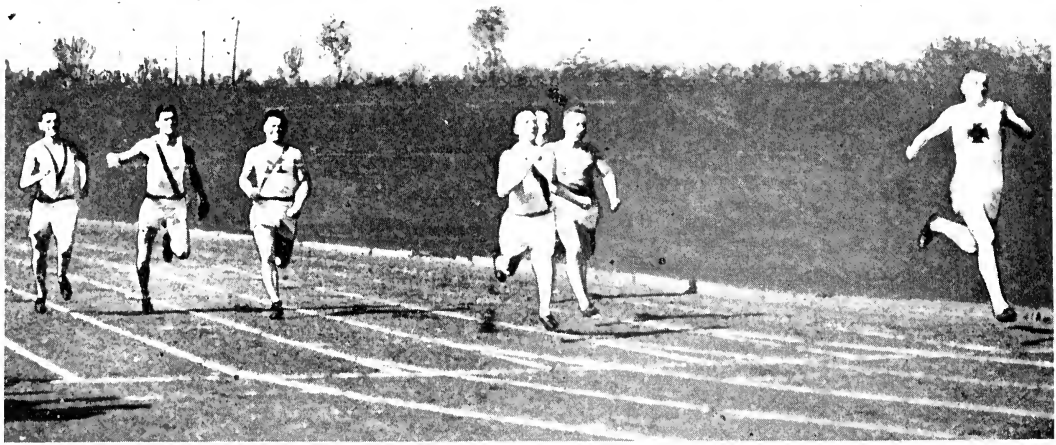
THE 220 YARDS DASH

Most one hundred yards men fail to realize the value of striding exercises and jogging when training for the longer dash, and as a result find themselves unable to continue on at full speed after the first seventy-five or hundred yards.

For this reason, few champions hold records in both events and few sprinters perform equally well in the two races. Drew and Paddock made their best record in the "hundred" and then trained for the "two twenty," after realizing the difference in the two events. Both men were capable of running a faster "two twenty," in point of comparison, than a "hundred," but seldom made an effort to go after the former record. A well trained sprinter entering both events should possess the ability to go through to the three hundred yards in fast time, and the ability to do this will assist rather than detract from his ability to run the century.

There are several methods of running the longer event and it will depend upon the track available. A "two twenty" around a curve, in which each man has a handicapped individual lane, makes it necessary for a sprinter to run through the first curve at fast speed, otherwise he may come out on the straightaway and find himself yards to the rear of a competitor running in the pole position, granting that he has an outside lane.

The race is too short to allow much conservation of strength, unless it is run on a straightaway track, which allows a certain amount of checking up. Ordinarily, a



Charles Hoyt, Grinnell College, Iowa, winning 220 yards special championship race at Drake Relay Games, the great Middle West classic; Hohman, Illinois, second; Shearer, Drake, third; Smith, Michigan, fourth; Carter, Wisconsin, fifth. The winner is using a long natural stride but shows no evidence of a kick-up behind. This type of action is particularly effective when it is used by the large, powerful type of athlete over this distance. Such an athlete can fortify himself against a surprise at the tape by cultivating a mechanical sprint finish, which can be used in emergency. The form shown in the illustration is properly a ground covering stride and in that respect is superior to the sprint. The sprint, however, is supreme in certain shorter events, or in the final fifteen or twenty yard sprint for the tape. The Illinois man, running fourth from the left, appears to be using the recommended sprint action. His arms are well placed and he is holding his form to the finish. An additional amount of body angle would improve his traction. Smith, running third from the left, is not using his arms, but otherwise is running well. The arm action as an adjunct to sprinting never should be underestimated. This holds true in general, even though certain exceptional individuals have made records without paying much attention to this factor.

fast sprinter will go out at a good clip for the first seventy-odd yards and will then stride easily but with almost equal speed to the one hundred and fifty yards mark, sprinting the balance of the distance. A strong sprinter with a lesser degree of speed is forced to make a sprint of it from start to finish.

A sprinter is subject to a greater amount of leg and body weariness in this race, therefore it is essential that he retain his running form which will carry him along after he has "run himself out." A "two-twenty" man never should attempt to check his speed before the first fifty yards, as this distance can be covered at top speed without loss of stamina. The foreleg action differs from that used in the hundred, as greater stride length is of value when striding through the middle section of the race. The foot and foreleg, therefore, are thrown forward to a greater degree, although not to a degree that will cause an upright body position. Hip action plays an important part in this stride-movement.

A novice possessing mediocre speed but possessing ordinary qualifications, including plenty of stamina, can best prepare himself for competition by developing his mechanical start and sprint action. If he can stay within shooting distance of the leaders by sheer nerve and leg strength, his ability to shift into a mechanical sprint finish will speedily make him a formidable antagonist, as most two-twenty men finish up with the slower stride or running style.

Finish of a 220 yards run; from left to right, in third, fourth and fifth lanes from left: A. B. Kelly (third), New York A.C.; R. F. Morse (second), Salem-Crescent A.C., New York; A. E. Ward (winner), Chicago A.A.—The sprinter on the extreme left is finishing up in very good style. His arm action seems to be slightly at fault, but otherwise his form is in accord with the accepted fundamentals of sprinting. The second sprinter from the left is a "leg runner," pure and simple, note the full extension of both arms; he is also kicking-up behind. He appears to have good forward angle and is well relaxed. Kelly, in the third lane from the left, is not using his arms to advantage and his shoulder action has thrown his body out of alignment. He shows a slight "chin lift" and apparently lacks forward body angle. Morse, second from the right, has anticipated the tape and has relaxed his arm action. Many sprinters by this premature movement fail to finish up at their best speed. A touch of "chin lift" has broken to a slight extent Morse's correct body angle. His leg action is exceptionally good and he is driving straightahead. He gives an appearance of all-round good style. Ward, the winner, on the extreme right, is using an effective finish form.

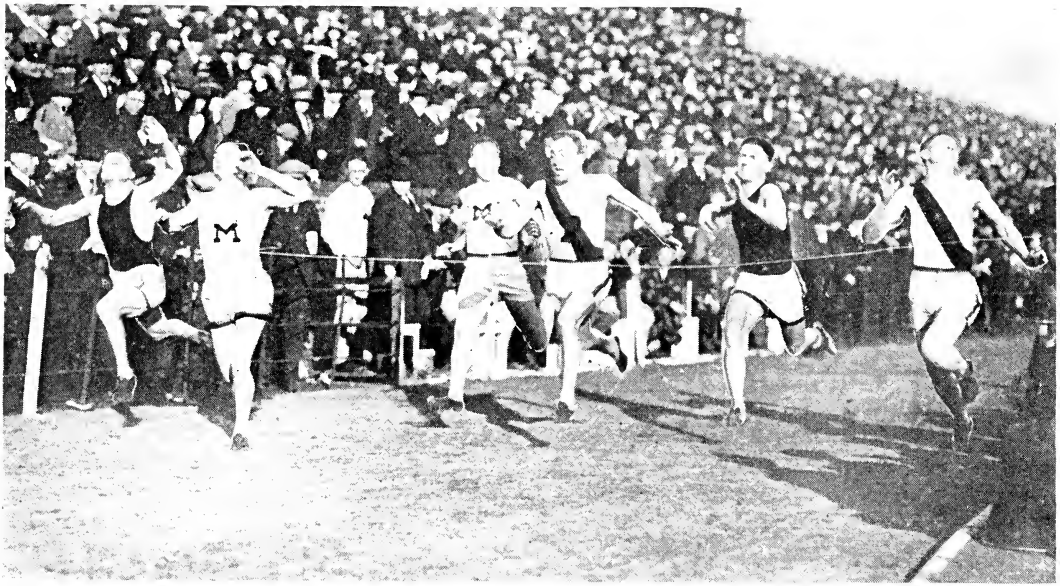
GENERAL SUMMARY

As has been pointed out in the Publishers' Note, it is obviously impossible to present a programme of instruction that would be uniformly recognized as standard. Inasmuch as athletic form is an individual matter, rather than general, it is apropos to mention that even in certain cases it may be advisable for a coach to disregard a recommended practise, if the procedure does not apply to the athlete.

Certain points in this textbook are particularly debatable, and for this reason it may be wise to briefly discuss these points so that the reader will at least have a majority of the facts at his disposal before he undertakes the development of a standardized procedure.

1. *The hand action in sprinting*—Several champions use the open hand action; others the semi-clenched, or fully clenched action. As a rule the latter is preferable, not only at the start but throughout the full sprint. Over longer distances, its value decreases and in the regulation distance events it may prove to be a distinct handicap. In the 220 yards the fully-clenched hand should be used coming out of the marks during the initial sprint and should only be relaxed to a semi-clench when a stride gait is taken.

2. *The hand position in starting*—The tripod position, while recommended and stressed, may, in numberless instances, be less practicable than what may be called a semi-tripod. In this style the thumb is held up to the start line with the first finger (instead of being dropped to the



Finish of a 100 yards run. J. V. Scholz, University of Missouri, winner; H. Lever, University of Pennsylvania, second; R. E. Brown, Princeton, third; J. A. LeConey, Lafayette, fourth. The sprinter on the extreme left side of the track is holding his head in a faulty position, but otherwise is finishing up in excellent style, as indicated by his forward body-lean, and the position of his forward knee and foreleg and his rear foreleg. The winner has concluded the race without undue exertion and has abandoned his body angle. The third sprinter from the left has turned toward his left, which has thrown his left knee out of alignment; his arm action is negligible and he is running in an upright position. The fourth sprinter from the left is holding his angle form, but has extended his right hand and arm too far forward and the left arm too far to the left and away from the body. The hand and arm position of the fifth sprinter from the left indicates that he is using shoulder action in lieu of arm action. The athlete on the extreme right has handicapped his finish style by throwing his head backward, the most common finish error, but he shows good leg action.

rear). The body weight—as in the tripod—is sustained by all of the fingers and the thumb, but is liable to be converted into a non-recommended position if the little finger is lifted off the track, thereby throwing too much weight forward and placing a strain on the wrist. In short, a recommended position is one that will permit the arms and wrists and fingers to hold up their share of the body weight when the "Get set" position is taken.

3. *The first step out of the marks*—A chopped initial stride has been recommended because most sprinters make this a stretch effort. This does not mean, however, that certain types of athletes should exaggerate or even stress the chop, for a natural effort on their part may produce the desired effect. Actually, a sprinter should be permitted to use a substantial step-out effort if it does not destroy his full forward lean and if it does not throw too great a strain on his rear sustaining leg. All these factors must constantly be taken into consideration. A close coupled (short and stocky) sprinter, with a considerable amount of muscular development, or perhaps any sprinter who owns a strong pair of legs, has a great deal of leeway in this and other features of what is considered correct form. One of our greatest exponents of sprinting in discussing this phase describes his form as follows:

"Upon taking the 'On your marks' position I immediately lean well forward, with my weight distributed between my arms, hands and forward leg, so that taking the 'Get set' position merely necessitates raising my back to the desired height. My first step out of the marks is not a chopped stride but a natural step-out with the leg well under the body. This step or stride is about three feet

Finish of 100-yards run at the Stanford-California dual meet; E. Sudden, Stanford, first; M. Kirksey, Stanford, second; G. Hartranft, Stanford, third—A majority of sprinters allow themselves to lose the smoothness of their form at the finish because they finish up automatically and are blind to their surroundings. They put every ounce of their strength into the last dozen strides and after the race feel as if they have given their best. As a matter of fact, this sort of effort, while commendable, is not well placed, for at this stage of the race the sprinter should be keenly alert to his weakness and strive to counteract it. These faults are chronic ones, for with fatigue and a desire to run faster there is always a tendency to "break," to use a trotting horse term. The fact that most track athletes develop these faults does not lessen the offense, for the right kind of preliminary training and thought will eradicate it entirely. Throwing science to the winds and trying to win on sheer strength and brawn undoubtedly will accomplish much in the case of the exceptional performer, but even he wastes energy. Form is the analysis of effort, and a careful study of cause and effect is bound to prove superior to the performances of the athlete whose ability is only "natural."

long, ahead of the start line. In reaching for this first stride, the forward foot should not at any time be more than six or eight inches above the track. This method is used for the first three strides, although, of course, the foot will be higher from the track on the second and third strides. The athlete should keep down and make this 'get-away' a sort of 'shoot-out' from the holes during the first three strides and will take his full sprint style in about ten yards. I find, by comparing this style with the chop style, that three of my strides will equal four chopped strides. This system, I believe, will work out with all types of sprinters and should get the sprinter into the running more quickly."

The foregoing statement proves the value of this method and for this reason the novice should devote some thought to the several methods instead of arbitrarily selecting one particular style. The exact length of the first stride will differ with the leg length of the athlete; hence no specified distance can be laid down. The height of the foot lift during the "come-out" will also vary. A high knee action will accentuate the height while a kickup-behind action will bring about an opposite condition. Too much height will prolong the suspension, however, but some height will add to the foot impact and will give traction and drive. The exact combination can best be determined by experimentation.

4. *The arm action while sprinting*—The stiff-arm uppercut punch used in coming out of the marks has been standardized, but there has been a great deal of controversy about the lifting arm-swing, with the emphasis on the forward swing, and the driving, pulling arm-swing

H. H. Ingersoll of Cornell winning a collegiate 100 yards.—The winner is using an extreme natural stride action, as indicated by the position of his rear leg. The leg action of the Harvard sprinter on his right conforms to the recommended method. Note that the knee has been lifted directly upward, thereby making a kick-up behind, as illustrated by the winner, impossible. A forward-facing position and the correct placing of the right arm, now too far away from the body and out of line, would give him an exceptional finish position. The winner shows a powerful effective action, owing to his absence of tension and his physical ability to handle the leg stretch. The extreme shoulder twist is not recommended. A certain amount of it is often worth while if the sprinter has difficulty in perfecting his choppy downward arm drive. It should be considered a compromise action, however. As a gainer of distance, at the tape, it is not to be compared with a forward and partially upward arm thrust. The runner on the extreme right is also using this shoulder twist to fair advantage. The position of his arms and a lack of arm tension shows that he is not using them fully. It incidentally robs the body of its forward lean, as illustrated in his case. His leg action is good. A study of any sprint finish will easily demonstrate the value of the forward body lean. Such a runner appears to be driving ahead with much greater force than the upright runner, and this is actually the case. His movements all tend toward a forward momentum, the other toward an upward-and-forward momentum. Its worth is therefore obvious.

which depends upon the down drive. Records have been made with both styles and this situation will continue. If an athlete uses a high knee action, then the down drive is the thing; if he uses a stretched ground gaining stride, then the swingup is best suited to his style. The oblique arm action, while still popular, cannot be compared with the straightahead arm action, but it will always find a certain amount of favor with strong natural sprinters.

5. *The finish action*—In a few words, any finish action that tends to force the torso or upper body forward without undue loss of balance is desirable. The jump finish will always be used by a small percentage of sprinters.

6. *Race strategy*—In the 100 yards event only one type of race may be run, as it is an intensive action all the way. The 220 yards event, however, may be run according to several plans. This can best be determined by the athlete or the coach, and the latter should be governed by the ability of the athlete. For instance, a 440 yards man is not advised to make a sprint of his event, and yet a recent national championship was won by a man who sprinted the entire distance.

7. *Knee action*—A well defined knee lift has been recommended, but certain types—by reason of their physical conformation—will find it difficult to attain a high standard of action. Such individuals, when the deficiencies or form faults are inherent, should attempt to develop a compromise action which will make up in effectiveness that which it lacks in technical form.

8. *Stride action vs. sprint action in competition*—Much of the criticism in the analysis of the illustrations has been directed toward the apparent users of what has

Finish of 100 yards run, Intercollegiate championships; won by J. A. LeConey, Lafayette; F. K. Lovejoy, Cornell, second; E. R. McKim, Princeton, third; E. Sudden, Stanford, fourth; E. J. Rusnak, Yale, fifth—The first, second and third sprinters from the left are kicking up behind to an unwarranted degree. The winner (second from the right) has evidently kicked up behind to a certain point because this action is indicated by the angle of the right foreleg. When a direct forward-and-upward knee lift is used the foreleg and foot position will approximate that of the sprinter on the extreme right. The third sprinter from the right also appears to possess the same approximate foreleg angle, although his action is partially obscured. The winner shows a free knee action, but it is evidently used to facilitate a stretch stride rather than a down-drive stride. The sprinter on the right is driving down in the approved manner and his arm action agrees with his leg action. Although he is using a semi-diagonal arm swing it serves its purpose in some cases almost as well as a direct forward-and-backward swing; this, however, will depend upon the individual. The rear left arm should not be allowed to swing backward to full extension and away from the body but should be held close to the body and only the elbow should go to the rear of the body. The two sprinters on the left are not using their arms to advantage. The second sprinter from the left is using a type of shoulder-swing as a substitute action. Several of the sprinters are almost straight up-and-down. The third sprinter from the left is off balance, but his follow-up right leg action probably will remedy the situation. The winner shows that he is getting a tremendous drive from his rear extended leg. Note the varieties of foot action of the competitors.

been called a "middle distance" or stride action, the suggestion being that a true sprint action would be more desirable. Actually the criticism may be unwarranted, for many of the athletes designated as showing faulty action are known to be exponents of good style. This point has been taken care of in the Publishers' Note, but added emphasis is not out of order. The purpose of this repetition in analysis is to form in the mind of the beginner a picture of sprint form and of stride action, so that he will not slavishly imitate the photographic action of the pictured champions unless the form is beyond criticism. In the past too much has been taken for granted and too much style credit has been given to champions who have forged to the front by reason of their physical and mental qualifications.

The pros and cons of many points could be discussed in a like manner, but the foregoing may serve to clear up any dissension that may arise by reason of certain arbitrary selections and recommendations. Roughly speaking, the points that have been put forth concerning body angle, value of straightahead action, ball of the foot landing, correct foot position, relaxation of certain parts of the body, the value of action that is not wasteful of energy and other specific matters that have been brought to the reader's attention may be accepted at their face value, for these are common sense fundamentals that cannot well be denied by any school of form. The experienced sprinter is not urged to throw overboard his own ideas, nor should the beginner accept blindly the theories that have been set forth in this textbook. It is always wise to first weigh all of the available evidence and accept only that which appears to agree with common sense principles.

Finish of the 1922 intercollegiate 100 yards run. The same finish taken from the opposite side of the track is shown on the preceding page. The former picture shows the sprinters during their last burst of speed. This illustration proves that most runners lose much of their form when they make their last lunge for the tape. The faults may not be obvious in every instance but it must be remembered that the slightest deviation from correct action may lose a minute fraction of time for the athlete. In this particular race there was little to choose between the second, third, fourth and fifth place winners, or for that matter the sixth man. It follows, therefore, that each competitor can best protect himself from an unfair decision by running out the race to a point well beyond the tape and by holding his same form to that point instead of anticipating the finish line and adding a variety of form faults.

CONDUCT BEFORE RACE IS CALLED

Many athletes make a great mistake by walking about the field before competition, and generally exhaust their physical and nervous energy before their event. A certain amount of nervous excitement will aid a sprinter, if controlled. Talking with wellwishers and amateur advisers tends to confuse, and certainly exhausts the competitor.

The sprinter—or any track athlete—should make a point of keeping to himself before he actually takes to his marks. He should get to the training quarters in ample time for a rubdown and a short jog down the track, supplemented by a few short easy starts. He should then return to the quarters and should lie down quietly until the first call is given for his event.

A quick rubdown should precede his second entrance to the track, which should be followed by a second jog to the "hundred" and a slow walk back to the marks. Two or three easy starts should be followed by a fast start and a vigorous short dash (the amount will vary).

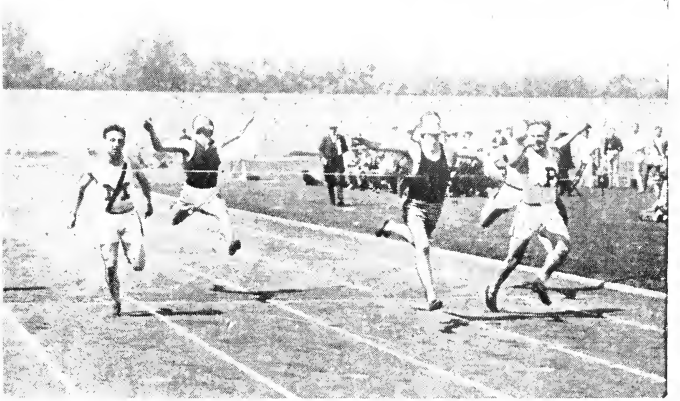
In the meantime the track position will be awarded and the sprinter may dig his start holes. Having carefully tested them for comfort and stability he should come out of them several times before getting down for the actual competition. If he has timed his preliminary workout carefully there will be no useless waiting about for the officials and competitors.

If the men are called off the marks for jumping or nervousness on the part of one or several sprinters, he should leave his marks and jog about until completely

Finish of 100 yards dash; Stanford vs. University of California; left to right: Johnson, Stanford; Trelka, California; Nicholson, Stanford; Stanton, California, winner; Needham, Stanford; Lachmund, Stanford; Claudius, California; Herrick, California. Lachmund was second and Trelka third.—Half of the sprinters are using an excessive amount of kickup behind, which slows the action to an appreciable degree. The winner is striding in beautiful style. This form is better suited to the 220 or 440 yards distance than the 100 yards event. The naturally fast man in nine cases out of ten will resort to what may be called a "running" style rather than a cultivated sprint form. The inability of hundreds of fast natural runners—of 10 flat and 10.1 caliber—to better their time may be generally traced to this tendency to hold to a natural effective arm-and-leg action.

relaxed from his former "Get set" position. Many sprinters make a mistake by remaining in the "On your marks" position until the remainder of the sprinters are called back for a second start. False starts often tend to unbalance the novice sprinter and such a raw recruit will find it hard to concentrate on the gun. An effort should be made to cultivate an even temperament.

The same general procedure should be followed after the preliminary and semi-final heats and all energy conserved as much as possible for the culmination of the event—the final heat.



Finish of National Collegiate A.A. championships, 1923; 100 yards run, won by Clarke, Johns Hopkins; Tykle, Purdue, second; Wittman, Michigan, third.—The Purdue sprinter, second from the right, shows the best finish form, as is evidenced by the position of his body and forelegs. The former could be improved upon but the latter is exceptionally effective. An additional upper body lean would bring him several inches closer to the tape and such an upper body reach often means a victory. Clark, wearing a dark shirt, in the third lane from the pole, is using a stretch stride of a type that is valuable in the longer runs, and especially so in the middle portion of the 220 yards run. Dropping the hands below the waist line (by eliminating the necessary bent arm position) is equivalent to giving away a handicap. Note that the sprinter on the left is guilty of this form fault. When the arms fail to drive in harmony with the legs it works a hardship on the latter members, for the legs can only drive effectively when they have the harmonious co-operation of the arms.

Finish of 100 yards run in A.A.U. national championships; won by Robert McAllister of the New York police detective force; J. A. LeConey, Meadowbrook Club, Philadelphia, second; Edward Farrell, New York A.C., third; William D. Hayes, Boston A.A., fourth. The winner (second from the extreme right) is finishing in fine form. He is driving off his rear fully extended leg and is lifting his forward knee in the recommended fashion. It is also evident, from the position of his foot and foreleg, that he is using the proper abbreviated stride and that he will drive down instead of reaching out for a full extended stride. The straight line angle which has been described is obviously in evidence. His competitor on extreme right is using an extended foreleg stretch and lacks the full forward lean of the winner. The shoulder swing at the tape is recommended as an aid to the finish, but is not recommended in the race proper. The third sprinter from the right is using the full forward stretch, and while it is admitted that this leg action will gain ground, it is not unequivocably recommended as a pure sprint action, although a number of champions have used it to advantage. The runner third from the left is using the recommended sprint action. His rear leg is well extended and he is driving off that leg with great force. He is well up on his toes and he is using a fine knee lift. The entire body is pointed straight ahead and a harmonious arm action is apparent. The height of the forward fist will vary; ordinarily it is best to swing it upward to a point opposite the shoulder. His driving momentum is obvious to the eye; the body is a unit and it is apparent that every part of it is working toward a single purpose.

THE MOST PERFECT STYLE OF PICKUP

Sprinters, middle distancers, or distancers, all will find the instructions on previous pages of benefit if put into use. While such running tactics will be sure to put "bottom" in the sprinter and warrant him in being able to continue his pickup and strengthen his striding for an increase in length at no appreciable expense of power, they will also be of untold benefit to those who take up other departments of running.

For the man who must at some period of his racing conserve his pace they will be found invaluable, in that they teach the "jump" (a quick burst of speed), which may be found extremely needful when the finish of a race is in sight and some other runner attempts to anticipate the stage when a runner must give up his best.

Interspersed with the work outlined the athletic student can give serious attention to furthering his competitive interests through the medium of sprint running solely. It is very much to be desired that he run when he can with someone as fast, if not faster, than himself.

He must at all times insist, in the matter of starting practise, on being held long enough to show that he can stand still, a custom which is quite foreign to the tactics of most sprinters. He must not permit himself to get accustomed to the "Get set; bang" system, which has been the ruin of many prospectively good sprinters.

Rather than be "fired off" his mark he would be better off in training alone, "setting" himself and holding his position a reasonable length of time. He could approx-

Finish of 100 yards run, Public Schools Athletic League, New York City; won by Frank Hussey, who established a new record for that event—The winner is using exceptionally fine straightahead body action and this includes his arm-and-leg action as well. A forward lean is being maintained (the figure is slightly foreshortened), although a semi-stretch stride is being used. Note the straightline leg position (both legs) and the equally correct foot position. Note the shoulder-high position of the forward hand and the lack of muscular tension in the upper body. A majority of champions develop numerous form faults when they approach the finish line at top speed. This sprinter shows a minimum number. The above photograph was taken when young Hussey was only seventeen years of age. In this connection a special note of comment—and commendation—is not out of order. Due to the careful, conservative manner in which Physical Director Collins brought his charge along—limited training and competition—young Hussey developed into a sprinter who was eventually able to hold his own with the pick of the country. Restraint should be the watchword of high school training and if it were practiced more there would be fewer "burnt out" athletes when they reach college age. Hussey is only one of a number of New York schoolboys who subsequently attained prominence in their specialties and their ability is a tribute to the excellent methods of the Public Schools Athletic League, under whose supervision all athletic sports are conducted in the schools of Greater New York

imate in his mind's eye the interval he had seen elapse in some important event at which he may have been fortunate enough to be present, but if he never has had this opportunity he might figure on, say, two seconds between the command and the firing of the pistol.

Finish of 100 yards run, Southern Relay championships; won by Chandler of Clemson—The winner appears to be using the non-recommended full-arm swing rather than the flexed arm action that is a fundamental of sprinting. Often the camera will show apparently poor arm action, with the arms meeting between strides in front of the body, when, as a matter of fact, the runner actually may be an exponent of the best recommended style. These analyses, however, are made on the basis of the form shown in the illustration, regardless of the reputation of the competitor or of his actually known form. It is only by these minute criticisms of apparent faults that the novice can gain an idea of what he should do and what he should avoid. In the above instance, had the sprinter been using good arm action, both hands would properly meet midway between the hips and the shoulders. It will be noted, however, that both hands are close to, and approximately opposite, the hips. The second (rear) man from the left is losing traction by reason of his foot position and he is employing a middle distance stride. The third sprinter from the left also shows the right sort of knee-and-leg style and has excellent body angle. The fourth athlete is using an elongated stretch which slows up his action, even though it gains ground. The runner on right is using an oblique arm-swing.

A sprint finish. The winner has elevated his shoulders somewhat, but generally displays effective driving form save for his arm position. The right arm should be flexed at the elbow and the hand should be shoulder high, while the left arm should also be bent at the elbow and in a position which would place the left hand even with the waist but not behind the body. The athlete on the extreme left has perfect leg action, but his upper body is badly out of alignment, thus destroying the effectiveness of his forward arm action. The trailing sprinter in the second lane from left, has a fair conception of arm and leg action, although he is running in a semi-erect position and his arm swing is of the diagonal type. His left shoulder also should be on a line with his right shoulder. The sprinter on the extreme right has landed flatfooted and is practically erect.

A POOR PRACTISE

There is little doubt about the crouch style of footrace starting being a yard and a half advantage to the present day sprinter as against the obsolete standup method, which is now used only by distance men. The difference in the starting system undoubtedly accounts for the somewhat general betterment in the matter of times returned nowadays for short distance running events.

While the successful use of the crouch is absolutely necessary if the runner is ever to get anywhere in the sprinting game, some of the methods for its acquisition go far toward nullifying the benefits which should be derived.

These have to do with the smart practise of trying to "beat the gun," this idea being probably brought about by lack of confidence in the pistol firer and the knowledge that he is as liable to "fire" someone else off.

Such tactics should be foresworn directly they suggest themselves or are suggested by someone else. In his training the average runner desiring starting practise is usually compelled to enlist the services of anyone who can say "Get set" in the event of a pistol not being forthcoming.

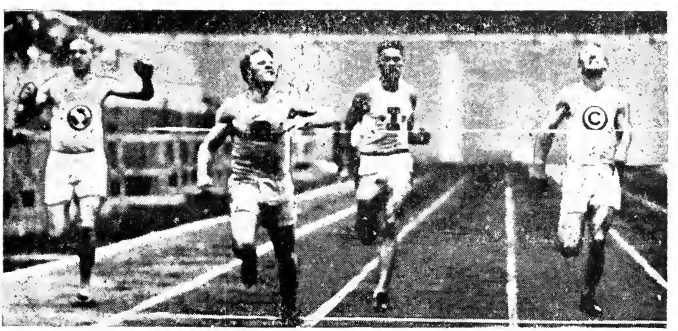
This particular scheme, viz., that of asking anyone to "give the word," has been productive of more troublesome men on the mark in regular competition than can be assigned to any other reason. In most cases the "starter" knows nothing about what he is trying to do, and with any and all those who are having a "go" trying to get away

Finish of Conference 100 yards championship, 1904. V. R. Rice, University of Chicago, the winner, second from right; Archie Hahn, University of Michigan (Conference and Olympic champion), third from right; C. Blair, former Conference record holder and co-holder of world's record, on extreme right.—The sprinters illustrated are generally using a powerful natural leg stride which properly is not a part of the short sprint races. Sprinting, in the final analysis, is a cultivated form and calls for a short, abbreviated downward armswing, a sharp upward knee lift and a curtailed foreleg stretch. The illustration shows good general straight-ahead action and all of the competitors appear to be running with the correct forward lean. Any deviation from the points suggested will undoubtedly slow up the action and detract from forward momentum. The majority of our best sprinters have used a more or less frictionless natural form, which is effective when the user has exceptional speed and power. The novice should never confuse this sort of action with mechanical sprint action, however successful its exponent may be.

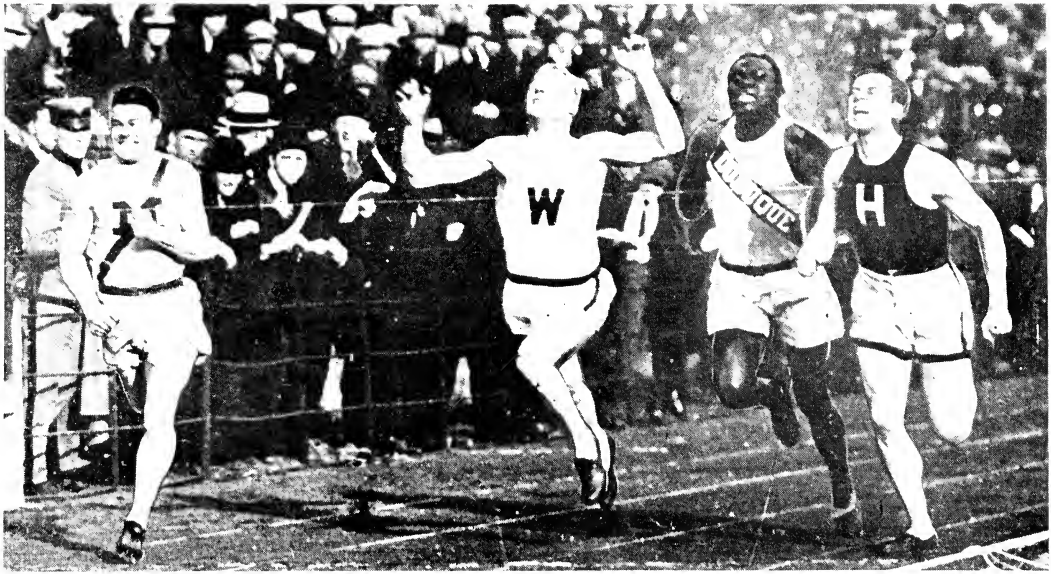
first, the real sprinter of the outfit is worse off than if he had no starting practise at all.

The consequence of such "starting" is that if the one giving the word does say, "Get set, go," the words follow almost simultaneously with most of the runners "on the move," or "bursting over."

The result of this type of starting practise is most harmful, and men desirous of improving their records would be more intelligently served if they went off by themselves and threw up a missile to be used as a starting signal.



Finish of A.A.U. national senior 100 yards championship at Chicago, 1923; won by Loren Murchison, Newark A.C. The form of the winner (second from left) is exceptionally fine. Note that his body gives the appearance of being a single driving unit. The slight chin lift is a part of his finish action and therefore cannot be criticized. He is driving off the toes of his rear foot and his rear leg is fully extended. He is using excellent knee action and there is no evidence of a kick-up behind. In general, he is using straightahead action. The other competitors lack body angle (forward lean). Several of them show a flatfooted landing; one shows neck tension. Few sprinters possess the harmonious action that is evident in the above illustration of Murchison, and their legs, arms and bodies, rather than working together toward a common end, give an appearance of individual action, each section of the body being intent upon its own business instead of being concerned with general efficiency.



Finish of an intercollegiate 100 yards run. H. Smith, University of Michigan, winner; C. Smith, University of Wisconsin, second; E. Teschner, Harvard, third; Sol Butler, Dubuque, fourth.—The intercollegiate champion, running on the extreme left, shows a number of finish faults in the stress of a close finish. The left elbow should be well to the rear and the left hand should be in a lower position, the right fist and forearm should be well up on a level with the chest or shoulder; the left foot is landing with the toe pointed toward the left instead of straight ahead; the right foot and foreleg are kicked up behind to a height that will prohibit a fast return stride. The second sprinter from the left is preparing to take the tape and has tilted his head backward. The position of the other sprinter shows that he has anticipated the finish by a fraction of a second. The third sprinter from the left is using the correct style of leg action and has a proper body-lean. The sprinter on the extreme right is not using his arms to advantage, and is using a rear kick-up; he is handicapped by a neck strain.

TRAINING

PERFECT CONDITION NEEDED

The perfection of physical condition is as necessary for a sprinter as for those who participate at longer distances, and it will not do to fancy that one can indulge in immoderate eating and drinking and bring out his best form at even 100 yards. Still, anyone who at ordinary times follows common sense rules in the matter of food will find that he is aiding himself materially in the matter of getting—and remaining—fit.

As a general thing, it is not practicable to run six days of the week. The distances are such that not much is taken from the athlete if the work is along proper lines, but a general tendency to overwork and the mental reaction is apt to produce staleness. A six-day training week was formerly considered to be the correct training method and is a throwback from the oldtime professional system. Of recent years there has been a decided tendency toward underwork and, during the competitive season a three or four-day week is sufficient when finished up by hard Saturday competition.

In view of the fact that while on the training track a good deal of the time is spent inactively—lolling about between dashes and the like—one should be careful about the attire. It is advisable to be warmly clad so as to offset the tendency of the muscles to become chilled. The bane of sprinters is bad tendons, and as there is invariably

Finish of the 100 yards, Olympic tryouts, Philadelphia, 1920; won by L. Murchison, New York A.C.; H. B. Lever, Meadowbrook Club, Philadelphia, second; W. D. Hayes, Boston A.A., third.—The runner on the extreme left is pointed directly ahead and shows good knee action. His upper body and neck are slightly tensed and he is not using his arms to full advantage. He lacks forward drive. The second runner from the left is depending mainly upon his leg strength; his form therefore lacks harmonious action. He is landing on the flat of his foot rather than on his toes. The third runner from the left has thrown himself out of alignment by the force of his shoulder swing. Surplus strength should be given to the final arm drive, while maintaining a straightahead position, and should never be allowed to twist the body to one side. Note the fine body angle, knee lift and rear leg extension shown by the winner (third lane from the right). Note the forward, rather than upward, finish arm stretch. Excepting the slight head twist, immaterial in this case, his finish form is practically flawless. Hayes (second from the right) shows a good driving finish and a correct knee lift. He shows a slight tendency to throw back and tense the upper body, emphasized by his arm lift. A forward arm thrust at this stage of the race would convert his form into nearly perfection. The runner on the extreme right is striding rather than sprinting.

quick action demanded of the muscles in sprinting, it is wise to make sure that the proper preliminary work has been attended to.

Training is always more pleasant in company, and the athlete should always make it a point to have someone train with him. Both will benefit by the rivalry which must ensue if they are of like parts, but care must be taken that this rivalry does not induce a desire for racing.

It is advisable to have someone who knows the rules of the game take care of the starting practise, which should be held with the aid of a pistol, the firer of which must be insistent that the men hold their marks.

Care must be taken by the starter to see that the runners are not "fired off." The admonition, "Be steady," should be the watchword of the athlete who intends to get all the good there is to be had from starting practise. Too much of this starting practise is to be condemned. The present style of start exerts a big strain on the muscles of the thigh and, in combination with the tremendously fast pick-up action, is conducive to breakdowns.

Many sprinters suffer considerable pain and inconvenience from such strain. If one has the misfortune to hurt the muscle referred to, it is suggested that he quit training and rest up, as that will be the only way out of the difficulty.

In training, therefore, be careful not to overdo the starting work. After whatever is done in this line, plenty of time should intervene, so that one is as near normal as possible. As a general proposition, trials against a watch are the next thing to a delusion and a snare.

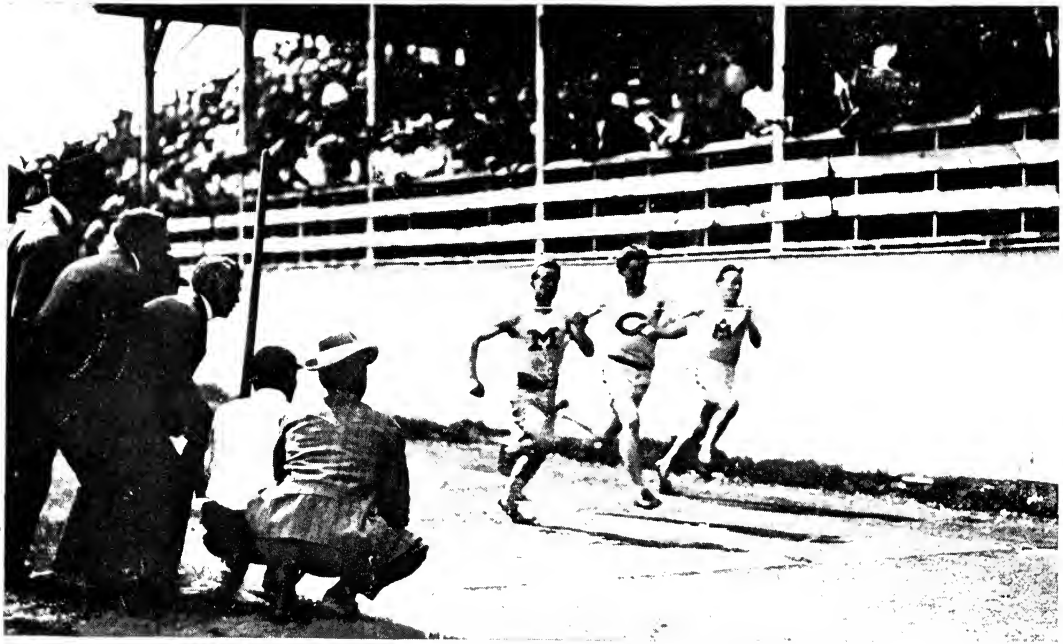
Finish of an intercollegiate 100 yards run. R. F. Brown, Princeton, first; E. O. Gourdin, Harvard, second; W. B. Wells, Stanford, third; D. H. DeWitt, Rutgers, fourth; R. D. Clark, Princeton, fifth.—The winner is using excellent finish form. Gourdin, running in the second lane from the left, is also running in good style. The position of his left shoulder, which is slightly ahead of the right shoulder, is not a finish fault in this instance, but is peculiar to his form. In the final analysis, however, it is not a sprint style shoulder action. The shoulders should properly retain a normal position and the arms should produce the added momentum, working easily from the shoulder in one of three actions the elliptical, the straight up-and-down, or the down-and-up, the emphasis being on the uplift in the former action and on the down drive in the latter. As explained in the text, the emphasis in the elliptical action is also on the down drive. Wells, sprinting in the outside left lane, is using good arm and rear leg action and also has proper body angle. His chin should not be elevated to the degree shown in the picture. Note the faulty landing position

PRELIMINARY TRAINING

As has been stated, the sprinter should make a definite effort to eliminate any faults; in the early part of the season at least three or four weeks should be devoted to various mechanical exercises which will assist in forming correct habits. During this period no attempt should be made for speed or fast starts. Stride length and ease of movement are dependent upon the hip and knee movement. The development of an exaggerated high knee action during the preliminary period will tend to increase the stride length, by giving the foot and foreleg time to reach out for additional distance. The same effect can be gained by increasing the circular hip action and striding from the hips. A combination of both is therefore helpful.

Every sprinter should make an effort to increase his length of stride without paying any particular attention to speedy pickup. While doing this, an attempt should be made to maintain a certain amount of body angle. Bounding exercises, or exercises which tend to make an easy and yet forceful foot landing, should be practised diligently, particularly if there is a tendency to pound the track in a stiff-legged non-relaxed manner.

After the muscles have been well stretched by these exercises, they may be forgotten for the time being and full attention should be given to sprinting form. The exaggerated habits learned during the preceding month will take on a conservative tone, but tend to produce a cleancut and more emphatic stride effort. Many sprinters take a few exaggerated knee exercises before competition, so



Finish of 100 yards run, Chicago vs. Michigan dual meet, 1903. Won by Archie Hahn, University of Michigan; Clyde Blair, University of Chicago, second. Time 10 seconds.

that the leg muscles may accustom themselves to the strain.

A prominent champion who always takes a great deal of care when getting ready for a race follows pretty much this procedure: Prior to taking his marks he first will run through a few bounding exercises, then stand in a stationary position and snap his knees upward, almost hitting the chin, which is inclined forward with the upper body, and will finish by striding easily, paying particular attention to the loosening up of his upper leg muscles and foreleg stretch. When sprinting at full speed, however, he jabs his foreleg backward and down, in an emphatic manner, keeping the body well ahead, and it is doubtful if any contemporary or past champion has made greater use of a forward arm-and-shoulder action, which is continued up to the finish line. His entire leg-body-and-arm action is intensely vigorous, every portion of the body making a co-ordinated effort to aid the forward momentum.

Every sprinter should take a certain amount of jogging throughout the season and especially at this time. The jog effort should take on an extremely slow "shack," without much attention being given to arm or leg action. This can be taken care of in the striding exercises and mechanical stunts. A sprinter can assimilate any amount of this sort of jogging and if taken at a three-minute-to-the-quarter pace, it will tend to build up the athlete, in so far as weight, endurance and condition are concerned, whereas if a fast jog is taken—an excessive amount—it will tend to wear down the physique.

The athlete should definitely outline his work and if leg strength, wind and condition are desired, the slow gait

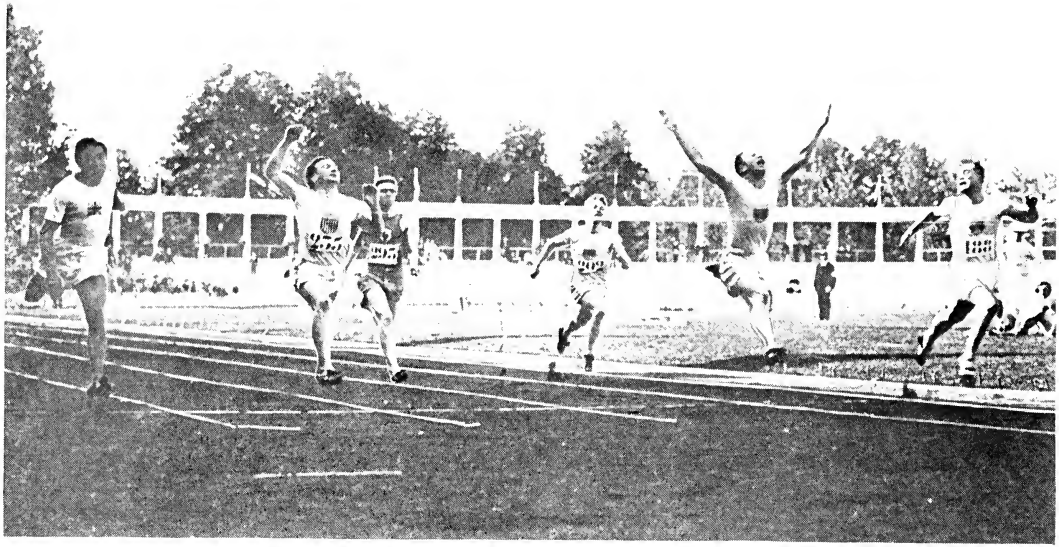
Finish of 100 yards run.—William Hayes, winner; L. Murchison, second; H. Willliams, third; P. White, fourth.—Hayes (on the extreme right) has passed the finish line, but is using good judgment in running the race out to a point well beyond the tape. Murchison, on the extreme left, has retained his body angle to a greater degree than Williams, who is also breaking the tape, and Hayes, both of whom have been caught by the camera in an upright position. Hayes and White (running in fourth place) are using a wasteful back kick-up. The forward lean, illustrated by Murchison, is good for a foot or more in a close finish as compared with an upright finish.

should be used. If striding strength is lacking, the former workout should be supplemented on certain days by a limited amount of three-quarter speed striding. An occasional quarter at half speed, with a fast finish, will also assist. He should never attempt to combine stride work and jogging in the same workout, however.

Sprinters are particularly subject to muscle and tendon strain, and scarcely a season goes by that some promising performer does not go into the discard by reason of a pulled muscle. This is due to the intensive strain placed upon the leg muscles at the start and throughout the race. Every novice or competing sprinter should go through a set of stretching exercises before taking to the track. If the muscles are stretched carefully before using them, they will not suffer from the later strain.

Lifting the knee upward and pressing it against the chest is one method. Bending over at the waist and touching the floor with the tips of the fingers without bending the knees is another. Bending down on the knees or raising to the tips of the toes will also stretch the running muscles. Holding the leg off the floor and shaking the muscles vigorously will also loosen them to a considerable degree. Any number of stretching exercises may be devised to guard against broken or pulled muscles.

After such exercise follow by a thorough massage or rubdown, taking care to separate each principal muscle and carefully working out the sore spots. Pounding is useless and is apt to be injurious. Slapping the surface of the leg, a common practise, will warm up the exterior body slightly, but has no real value. (Useful information on this subject can be acquired in Dr. Hutchins' answers to questions on page 240 of Appendix.)



Finish of 100 meters race in 1920 Olympic Games.—Charles Paddock, University of Southern California, winner; M. M. Kirksey, Stanford University, second; H. F. V. Edward, England, third (on extreme left).—Paddock is using a "jump" style finish, his entire action indicating extreme effort. The remainder of the contestants are using a fair amount of running angle but poor arm action. The first three from the left are using a wasteful backward-and-upward foot-kick. The "jump" finish should never be cultivated but may be used if it is a natural involuntary effort.

The trainer should also supplement his rubbing with vigorous shaking exercises. After this precaution, the sprinter should walk slowly out of the training quarters (running out at full speed is a common practise and is most injurious) and drop into an easy, slow jog about the track, stretching the muscles by slow degrees. After completing a slow quarter the runner should walk a bit and then take a fifty-yard stride at half speed before taking to the marks.

The first starts should be taken easily, without a gun or hand clap, and without much tension. If the day is cold or raw it is well to forego all starting. Three or four easy starts always should precede any competitive starting.

The foregoing precautions may appear to be unnecessary, but require little additional time, and if followed out faithfully there will be no broken down useless sprinters. A sprinter will often go direct from a classroom and attempt to call upon his muscles after they have been held in a cramped position and as a result will be out for the season. He may have taken a motor trip in the same cramped position, or he may have been sitting on the bleachers. Any one of a dozen mistakes will bring about the same result. A great many track athletes work out for a while, and then sit down on a bench to cool off, forgetting that the muscles are taking on a cramped, chilled position. A subsequent start or sprint without properly warming up, will often prove injurious. Work out, therefore, on a careful schedule, and in general make it short and snappy, even though the day may be warm. Sitting on the damp ground or grass is equally injurious.

Finish of 100-yards dash, University of Pennsylvania Relay championships; LeConey, Lafayette, first; Lovejoy, Cornell, second; Graeb, Columbia, third; McKim, Princeton, fourth—Lovejoy of Cornell, third from the left, is giving an example of straightahead running and in spite of his extended foreleg action shows no kick-up behind. This is exceptional, as the majority of stride runners always waste a lot of energy by kicking up high behind before they start their forward stretch. A casual study of this illustration confirms this fact. Although Lovejoy's chinlift has not interfered with his evident forward body lean, it is certain that the resultant muscular contraction will interfere slightly with the runner's finish. The winner is obviously checking his speed and in so doing has thrown himself off balance. This is a trivial matter in certain respects, but it may result disastrously in isolated instances. Sometimes it will strain a weakened muscle or cause a generally unpleasant reaction. The same may be said of the practise some runners have of suddenly stopping a fast gait with a series of short, choppy strides or of starting out at top speed without properly warming up. These injuries do not always manifest themselves at the time but appear at a later period when weather conditions are not propitious for muscular exertion. The sprinter cannot over-emphasize these seemingly unimportant details when the heavy toll of muscular injuries is taken into consideration.

PREPARATION FOR THE RACE

Generally speaking, a track athlete will require not less than two days' rest before competition. This may vary slightly during the season. The legs require a great deal of rest and the slight value of an extra day's training cannot compensate for the lack of leg spring and mental vigor which comes with sufficient rest.

Plenty of sleep is an essential part of the training schedule. A minimum eight hours should be allowed. Inasmuch as the excitement of a coming competition has a tendency to upset the athlete, care should be taken to undereat rather than load the stomach with unnecessary food.

If the meet takes place in the afternoon, the sprinter should get up at his regulation hour, eat a light breakfast of the usual type and should then keep off his feet until the hour of competition. A light lunch should always be provided, taking care to allow several hours for digestion. Any light food will do.

There are two types of competing athletes—those who refuse to think of their event and those who concentrate upon it. The former should not remain alone, therefore, but will be better off in company with others. The latter class should keep to themselves. A sprinter should radiate confidence always when in company with his competitors, as this attitude of indifference means a great deal from a psychological standpoint.

The sprinter should provide himself with several pairs of shoe laces and should be sure that his sprinting shoes

Finish of the Oxford-Cambridge vs. Yale-Harvard 100 yards sprint race; Harvard Stadium, 1921; won by Gourdin of Harvard.—The three sprinters on the line are finishing in fairly good form. Gourdin, on the extreme left, has turned his head and the English runner on the right has thrown his head backward. The latter is also kicking up behind to a considerable degree. Gourdin is chopping his left foreleg down in the proper manner, but shows a partial loss of body angle from the waist to the head. His left arm should either retain its normal position to the side and rear, or should be thrown directly forward and upward as the tape is taken rather than being thrown to the side and rear.

are in good condition. When possible, a sprinter should possess two pairs, if entered in both races. A muddy, wet track may waterlog a single pair and make them unfit for later competition.

Sprinters and other athletes as a general rule spend too much time, either from the field or from the windows of the training quarters, in following the other events. *An athlete should never attempt to play the dual role of spectator and performer.* A seasoned campaigner will spend the interim between events by resting and is satisfied to get the results from the morning newspaper accounts.

If training quarters are not available or conveniently located for visiting athletes the sprinter should make a point of providing himself with a number of blankets, so that he can keep himself well covered between events.

The greatest single danger in training is overwork and it is certain that a large per cent of our track and field athletes enter competition in poor condition. Overwork either produces physical inertia or mental distaste, or a little of both. This condition is called staleness. Rest is the only medicine or antidote.

Finish of an American tryout sprint race, prior to the Inter-Allied championships at Paris, 1919; left to right: Charles Paddock, University of Southern California, world's sprint champion; E. A. Teschner, Harvard University; Sol Butler, University of Dubuque; E. A. Torkelson, Phillips Exeter Academy; H. B. Lever, University of Pennsylvania—Paddock lacks body angle (forward lean) and shows a neck strain. All of the competitors appear to be landing on the flat or ball of the foot rather than using the toes. Both Paddock and Teschner should bring the forward hand to the approved height, which is approximately of shoulder height. Teschner shows a partial "tie-up," instead of a full easy relaxation of the head, neck and shoulders (the term "tie-up" is used to describe any running action that prevents maximum time). Butler has the necessary body angle, but appears to be slightly off balance. His arms are not contributing to the momentum, and he is also kicking up behind. Torkelson is using a particularly effective running or striding form, but one that is better adapted for the 220 yards stride action or middle distance events. The finish of the 100 yards or 220 yards should always call for an abbreviated arm and leg action, with body angle, a short vigorous downward arm action, a sharp knee lift and a distinct downward foreleg chop. Judged from a stride or middle distance viewpoint, Torkelson's form is practically perfect in every detail. Lever could use his arms to better advantage and is using a bad kick-up behind. Sprinters and runners should train themselves to run the race out without turning their head toward their competitors.

CARDINAL POINTS OF TRAINING FOR THE BEGINNER

One who desires to be a good athlete must first and foremost learn to train. He must learn how to take care of himself under training. The following pages deal only with these general rules for taking care of the body when one "goes into training," as it is called, for any athletic event.

Before a man begins systematic training he should ask himself the following questions:

Have I a constitution strong enough to train in this athletic event without risking my health?

Have I strength of will to be able to train fully and to be able to profit by its training?

What sort of body exercises do I need most?

How should I train in order not to risk my health?

Every young man who desires to take part in athletic events should always remember that if he trains carefully he can train harder without the danger of any bad results. Before he begins his training he should consult a physician and assure himself that he is not suffering from any sickness or weakness whatsoever. He must be in the best of health to be able to take part in training or athletic games.

Having assured himself that there are no defects in his constitution he can without fear begin his training.

Finish of 100 yards event at Intercollegiate championships; W. H. Ganzemuller, Penn State, first; W. C. Haymond, Pennsylvania, second; F. Davis, Pennsylvania, third; T. W. Bossert, Massachusetts Tech, fourth; H. E. Shackleton, Cornell, fifth.—The first, second, fourth and fifth runners from left are handicapping their finish by lifting their chins and tensing the upper body section. When this action is prolonged it ties up the body to a certain degree; if it is found only during the final stride or two it robs the sprinter of an inch or so of space, as it creates an erect position. A forward lean will often enable a sprinter to earn a tie. Sprint races are generally quite close and a scientific student of the sport should take advantage of every point, in spite of its apparent minor importance. The winner is employing a decided jump finish and, as has been pointed out, this style is often of great advantage to certain individuals. It is not recommended as a fundamental of the sport, however. Certain sprinters use it when competition is particularly keen, involuntarily throwing themselves forward under the stress of the moment. The fourth sprinter from the left is using fine leg-and-arm action. Note his obvious forward drive. The second runner from the right has entirely neglected his arms. The runner on the extreme right is running (rather than sprinting) in excellent style.

REAL TRAINING WORK

By the time the athletic youngster has got his underpinning and general makeup in what may appear as satisfactory shape, he should be able to do some real training work. After a proper attention to the details of running form he should be in line for the serious side of sprinting.

His preliminary endeavors in quest of style (form) should have been such as to warrant an ease of movement from every standpoint, which will demand no undue expenditure of power and guarantee him a success which might be denied him were it not for the fact that he was possessed of the proper fundamentals.

It is well for runners of all types—sprinters and distancers alike—to essay in their preliminary running the traveling of distances in excess of those which they may intend to run in competition. This will serve to promote the stamina which will be found needful, together with the other forces which will perfect the continuity of pickup, so necessary in sprinting.

Sprinters, that is, those who have decided on distances up to the limit of 300 yards, should undertake jogging work up to half a mile or thereabouts at a pace where the running form always must be the main objective.

There should be no inclination during the early stages of training to rush one's preparation, and, furthermore, no attempt at fast work at the distance decided upon, the purpose of the work being solely to make for a striding action which is natural and as near as possible to the form desired.

Finish of 100 yards run. J. E. Patterson, University of Pennsylvania, first; O. A. Keller, Cornell, second; D. F. Lippincott, University of Pennsylvania, third.—Keller, on the extreme left, is finishing up in good style. His knee and rear leg action is typical of excellent sprint finish style. His body angle is also exceptionally good. He has twisted his head to the right, however, and this side deviation is aggravated by the diagonal swing across the chest of his left hand and the backward swing of his right arm. The left fist should have been punched directly ahead and slightly higher and the right hand should be closed and opposite the right hip, with the elbow projecting behind the body. Note that the winner is about to throw his arm forward and upward, rather than upward.

A good idea in connection with this phase of training work will be found in changing pace frequently during the jogging jaunts of half a mile previously suggested.

This involves more stamina than is needed for the uniform striding which will be used when one runs the distance well outside what he might do if he were running against a watch.

This particular bit of training work, while a bit more strenuous than that where the pace is even throughout, is of the type which combines the real sprinting action and that of its near relative, the striding effort. The combined use of these in moderation as suggested, will serve to fit a man for whatever distance he may have in view quicker than sustained efforts against either man or watch.

It consists of nothing more nor less than use of the striding style for one hundred yards or so, after which a change is made to the true sprinting action for a "burst" of twenty-five yards. With this intermittent pace great good can result, but care must be taken in the matter of slowing up gradually at the finish of each "burst."

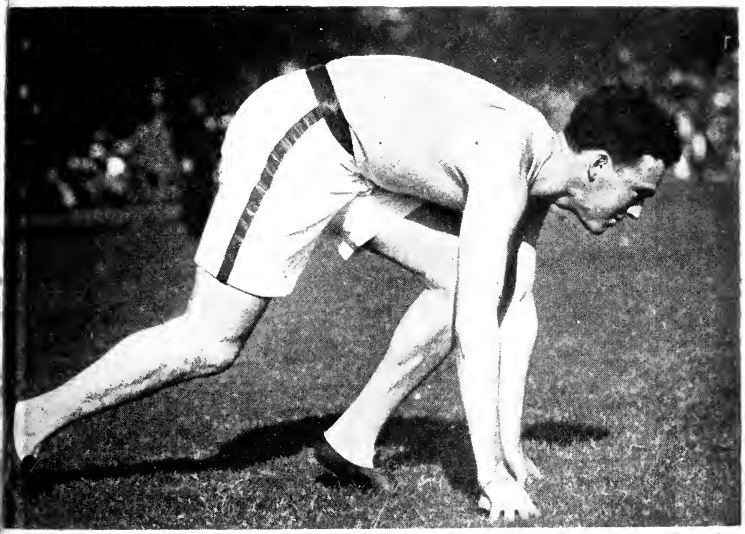
This phase of running will be found exacting and it will depend upon the runner to see that he is not "pulling his cork" by carrying the idea of long sustained sprint pace too far.

In most forms of training, work of a running nature, excepting a real trial or against another runner of presumed equal caliber, should be at all times along lines which would warrant a repetition soon afterward if necessary.

All the while the runner is trying to conform his work to the ideas outlined relative to style, he should be making

Finish of the 100 yard event. Intercollegiate championships. Brown, of Princeton, first (third from right); Gourdin, Harvard (fourth from right), second; Wells, Stanford (second from left), third; Dewitt, Rutgers (second from right), fourth; Clark, Princeton (on extreme right), fifth.—Wells shows the right sort of driving momentum and traction. Note the full extension of the rear leg—the drive off the toes, the knee lift and the absence of the foreleg stretch—all recommended points for a close sprint finish. His angle is broken by his chin lift which is a handicap in proportion to the attendant neck muscle strain. Brown's body angle could be improved by straightening his left leg. All of the competitors with the exception of entries from Yale and Stanford are kicking up behind to a maximum degree. Note the rear foot position of the sprinter on the extreme right. A student of sprinting will find that the length of such a stride can never compensate for the loss of time and energy required for the effort. A pencil tracing of his foot action from the time it leaves the track until it lands again will show an astonishing loss of efficiency when compared to a direct upward lift of the type shown by Wells. The exaggerated shoulder swing, as used by Gourdin, is not a part of sprint form, although it has been used to advantage by a number of sprinters and middle distance men. Individual users of this action do not as a rule use their arms to full advantage, depending more on this same shoulder swing.

play of his training efforts. While it is true that the athlete should be serious in his intentions, the more he makes of the play side of the sport the better he will be off when the time comes for him to ask his muscles the all-important question as to whether they are to respond satisfactorily or not.



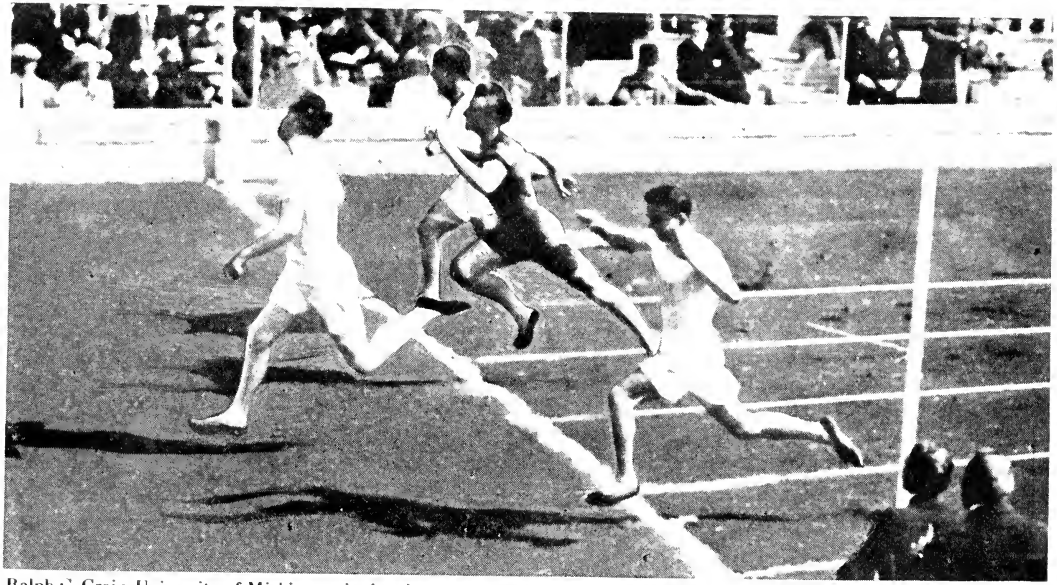
J. Walsh, New York Athletic Club, former national 440 and 880 yards national champion, illustating the old style extreme foot spread. Prior to 1900 a majority of our best track performers ed a similar "get set" position and any deviation from such an approximate position was considered to be poor form. At no time was the rear knee allowed to go farther ahead than an pposite-the-heel-of-the-forward-foot position. Since that time the rear knee has been brought eadily forward and today many of our best sprinters prefer the short footspread start, with the ar knee opposite the toe of the forward foot and in some instances ahead of the toe. Both xtremes may work to advantage in certain instances but it is recommended that the uninstructed vice shall adopt a compromise position, so that the rear knee will be opposite the instep of the rward foot, for from this position any type of runner will be able to make an effective start.

Final of a 100 yards run in a national championship meeting; left to right, Howe, Colby (fifth); Morse, Salem-Crescent A.C. New York (third); Loomis, Chicago A.A. (winner); Ward, Chicago A.A. (fourth); Meyer, Irish-American A.A. New York; (second).— The illustration shows a general lack of knee lift, a fundamental of sprinting, Meyer being the one exception. His right knee is coming up and ahead in fair style, but for perfect form the upward lift should dominate the forward-and-upward swing. The greatest offenders in this respect usually kick-up behind. Paddock is a notable user of the upward knee lift and the hard downward stamp. This style differs radically from the greater stride stretch of natural sprinters or runners. Natural striding in nine cases out of ten is a wasteful action. When the chopped foreleg drive is used as a part of the upward lift the stride becomes a simple movement to perform. The knee always takes the lead rather than the foot and leg. The action calls for a distinct series of jerks and downward drives. Meyer is using a vigorous type of arm action to the very finish, as is proper. As a general rule a sprinter will add to his chances if he maintains his arm action and maximum leg action well beyond the finish line. Many races are lost by this immediate slackening of speed. The slackening process, in practise and in competition, should be done gradually, as an undue strain of this sort may pull or strain a muscle.

SUGGESTED TRAINING SCHEDULE

It is, of course, understood that the following suggested schedule of training is based upon the capabilities of the average athlete. Other circumstances enter largely into the matter, such as geographical location, prevailing weather conditions and, lastly, the characteristics and temperament of the individual athlete. Naturally, the strong, sturdy type of sprinter will need less of the stamina producing exercises and more of the quickening work. On the other hand, the quick, nervous, alert runner usually requires a systematic preparation for endurance. This schedule, while hardly practicable in certain respects—so much time being devoted to preparatory work—is theoretically sound, and any competitor can select from it a working programme that will suit his individual requirements.

There is a keen feeling among experienced coaches that a word of warning to the tyro coach and inexperienced athlete concerning the need of caution and conservatism in early season training is always in order and for this reason the suggested schedule has stressed that phase of the question strongly. Usually a coach takes up his action work at the earliest possible moment, for the shortness of the season often makes this policy imperative, but only a thorough student of condition is qualified to shorten this prescribed preparation. Others less experienced are urged to bear in mind the importance of a training schedule that will build up the physical body to a point of safety before undertaking the strenuous demands that are a part of competitive



Ralph C. Craig, University of Michigan, winning the 100 meters final at the Olympic Games at Stockholm; time, 10 4-5 seconds; A. T. Meyer, second; D. F. Lippincott, third; F. V. Belote, fourth. All members of the United States team. Shows winner turning his head toward the right and also indicates a relaxed arm action. The leg action is still vigorous. The left rear leg shows too much kick-up behind, although the forward leg is coming down in the proper manner. The competitor nearest the judges is using excellent knee action and the position of his rear leg indicates that it will be brought forward on the next stride without using the wasteful kick-up. The runner in black, third from the pole, is using exceptionally good sprint form. In comparison, the other competitors appear to be running in erect position. Note the angle which would be produced if a line were to be drawn from his rear left foot to the head, showing that the sprinter is well ahead of his landing foot. A maximum amount of traction and drive is possible when this position is maintained. The forward right knee has been brought upward sharply in true sprinting style and allows for the subsequent foreleg downward chop. His left arm is held so that it may also be chopped down in the recommended sprint fashion.

Copyright by Underwood & Underwood, N. Y.

athletics. Common sense logic, after all, is the basis of intelligent training.

FIRST MONTH.

First week—

From one to three laps (quarter-mile track) each day, using extremely slow jog pace, preferably interspersed with short walks. *No sprints or starts.*

Second week—

Mechanical stretching exercises in moderation for form on Monday, Wednesday and Friday, concluded by one or two laps of jogging.

On Tuesday, Thursday and Saturday one or two laps of easy jogging plus one or two laps of half-speed striding. No sprints or starts.

Third week—

Same as previous week save that exercise period can be lengthened and the half-speed stride gait may be occasionally increased to a three-quarter speed stride gait. No sprints or starts.

Fourth week—

Same as third week insofar as exercises and jogging programme is concerned, but stride and fast jog work may be interspersed with 220 yards of pickups, after the sprinter has warmed up with a few stretching exercises and several easy laps (the amount will depend upon weather conditions).

A "pickup" is a short burst of sprint speed from a running start begun and ended gradually. The actual burst of speed—or pickup—should at this time only cover about

H. L. Smith, University of Michigan, winning a 100 yards run; Teschner, Harvard, second; Ingersoll, Cornell, third; Treadway, Yale, fourth; J. L. Folly, Harvard, fifth.—The sprinter on the extreme left has good all round style, save for a slight backward tilt of the head and the extension of his left arm. In sprinting the arms should be always well flexed at the elbow. The second sprinter from the left is striding easily and appears to be using a low diagonal sidearm swing instead of the upward and downward arm chop. The third sprinter from the left is using a vigorous running style, with a full arm and shoulder swing rather than abbreviated sprint action. The fourth sprinter from the left is using correct form, with the exception of a backward twist of the right shoulder, which throws his upper body out of alignment. The fifth man from the left is leaning well forward, but is not using his arms to advantage and is kicking up behind. The winner, running on the extreme right, is also depending upon his leg ability rather than a combination of leg and arm action. He is also kicking up behind. This type of powerful running action is typical of many champions who lay particular stress upon a vigorous stride movement.

twenty or thirty yards. The sprinter then jogs forty or fifty yards before starting another burst. The sole purpose of this preliminary work is to prepare the athlete's muscles for the more strenuous sprint work and to instill some idea of form as well as to give a certain amount of all-round stamina.

SECOND MONTH.

It is particularly essential that the daily work be preceded by a series of stretching exercises, of the type recommended in the text. Adherence to this rule will greatly diminish the number of strained tendons and pulled muscles that are inevitable when an athlete attempts track work without this precautionary preparation.

First week—

Weather permitting, the sprinter may now devote at least three days a week (every other day) to the mechanics of starting, but without using gun starts. Taking the position and getting out of the marks easily will suffice. Considerable time may be spent on this department if a sensible programme—one that is not overdone—is followed. Two days a week—for instance, Tuesday and Thursday—should still be devoted to half and three-quarter speed striding, commencing and ending with an easy jog. No work on Saturday.

Second week—

Same programme as first week (of second month). Actual speed starts may now be taken over 20 and 30 yard distances on sprint days (Monday, Wednesday and Friday). On Tuesday a three-quarter speed stride over

Another view of Smith of Michigan winning a 100 yards run. In this it is apparent that the winner is using the proper forceful arm action. Hs is also running well past the finish line and is holding his forward body-lean. His knee and leg action is good and he is running without body or neck strain. Both legs and arms are contributing equallly to the complete action and there is no evidence of misdirected energy.

the 100 yards distance. By "stride" is meant a running effort which demands the full use of the foreleg stretch and arm swing (explained in detail in first chapter of this book). This distance may be repeated after a short rest.

On Thursday a 220 yards half-speed stride may be taken twice. No work on Saturday.

Third week—

Same as previous week, save that sprint work may be increased to 50 yards distances or slightly longer.

Fourth week—

Continue with work of third week except that sprint distances may be increased up to 100 yards and stride distances up to 220 yards. A three-quarter speed gait should be used for the strides. It is recommended that "pickups" be used at least two days a week.

THIRD MONTH.

This period is ordinarily considered the competitive training season, and at this time sprinting, starting, striding and pickup exercises may be used. The work should be so varied that a light day's work will succeed a stiff workout. The sprinter or coach can easily determine this. The runner should never undertake a hard workout or sprint unless he feels capable of going through with it in good shape. No work should be taken when there is a disinclination to work. Having gained leg and body stamina, the stride workout may be lengthened and the start and sprint workouts also increased (depending upon whether the athlete is running the 100 or 220 yards, or both).

Finish of a 100 yards run.—Roy Morse, winner; A. T. Meyer, second; A. B. Kelly, third; R. J. White, fourth.—Morse, on the extreme left, is finishing up in good style and without body tension. Kelly evidently has thrown himself violently toward the tape in a final effort to score and has abandoned his straightahead action, a common failing among all sprinters. The sprinter usually will unconsciously twist around and away from his outstretched hand when such an effort is made. The same sprinter under other conditions may finish up in the recommended fashion, particularly if he is in the lead. As has been stated before, this fault can be counteracted only by a strong mental concentration prior to the finish, a determined resolution to keep to correct form, come what may. White, running in the third lane from the left, is making little use of his arms. Meyer, on the extreme right, is running easily, without tension, and has already adopted a stride action and an easy arm movement.

FOR THE WEEK BEFORE THE FIRST IMPORTANT MEET.

Increasing attention should be given to the details of preparation, with emphasis on the stretching exercises, massage and general physical condition.

Monday—A fairly full day. If a sprint day, include one 30, one 50 and two 100 yard dashes. If a stride day, at least two 220 yard strides, one at half and one at three-quarter speed. In both instances a quarter-mile warming-up jog should precede the day's work.

Tuesday—A jog to warm up, followed by a moderate number of pickups (50 or 60 yards to each burst).

Wednesday—A few starts (after warming up) and several 50 yard dashes. In all, a light workout.

Thursday—It is recommended that no work be taken. Alternative (if coach feels runner needs the work), one quarter-mile jog, two or three starts, followed by a thorough leg massage.

Friday—No work.

Saturday—Competition.

FOR WEEK FOLLOWING FIRST IMPORTANT MEET.

As a general rule it is a good plan to rest on Monday, particularly if no meet is scheduled for the following Saturday. If there is such a meet scheduled, it may be well to take a warming-up jog, several easy starts and possibly a

The illustration shows Drew winning an event in easy fashion at the Pennsylvania relays without any indication of body tension. His perfect knee action is particularly noticeable, as well as his forward body-lean. The easy position of his arms shows a dependence upon the ability of his legs to carry him through. Drew's ability to stride easily at a sprint pace was an outstanding feature of his style. The athlete on the extreme left is sprinting in perfect form, except for the position of his left arm, which should be drawn in closer to the body. The sprinter on the extreme right is running on leg ability alone, as the picture shows that he is not using his arms to advantage. Exaggerated "knee lift" exercises should be practiced daily so that it will become a natural habit to run, stride and sprint in the style illustrated.

220 yards stride at half speed. The regular work used in previous week may be taken on Tuesday, whether or not a meet is scheduled. Likewise a light workout should be taken on Wednesday. If a meet is scheduled for Saturday no work at all should be taken on Thursday or Friday. If no meet is scheduled it will be a good plan to make Friday's workout a real stiff one, in which event work should be discontinued on Saturday and Sunday.

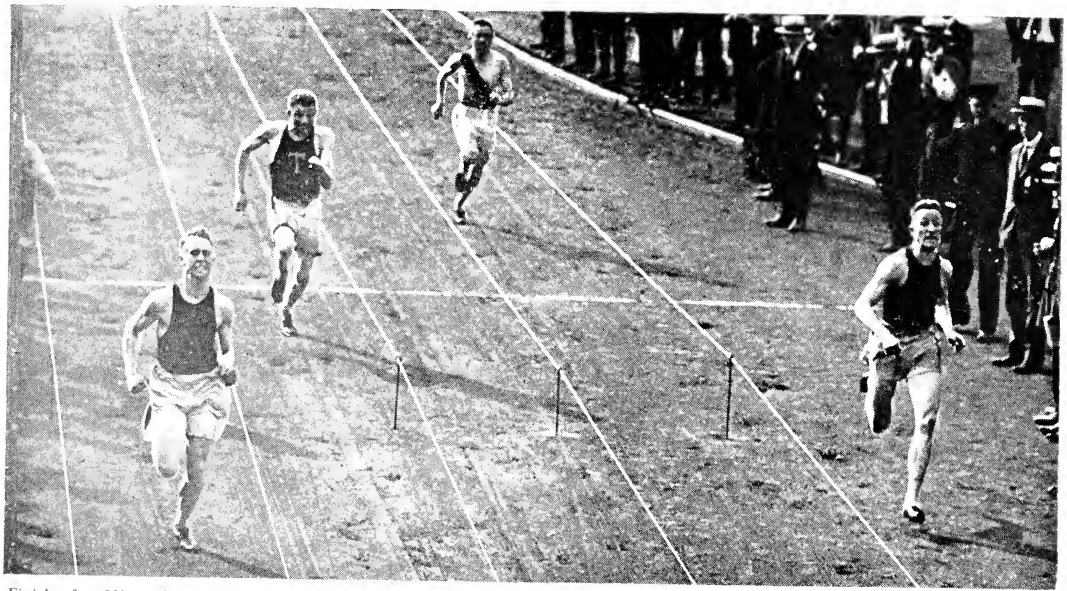
FOR MIDDLE SEASON AND LATE SEASON MEETS.

At this time more attention should be given to the technique of starting and less work should be devoted to the more strenuous striding exercises, as the early season stamina already gained will carry the sprinter through in good shape, for it is to be presumed that the weather has sufficiently warmed up.

The question of staleness now becomes a paramount issue. Staleness can best be counteracted by a relief from the severe work of the early season. Form and stamina once gained will hold over throughout the balance of the competitive period. If the athlete shows a keen distaste for work (after having gained his top form), it is advisable to have him lay off entirely during the week, except possibly on Tuesday or Wednesday, when a very light workout may be taken.

INDOOR COMPETITION.

These recommendations may be applied to preparation for indoor competition as well as outdoor, although gen-



Finish of a 220 yards run. Left to right: C. Hammond, University of Pennsylvania, winner; H. W. Bossert, Massachusetts Institute of Technology, fourth; N. E. Brown, Princeton, fifth; F. J. Shea, University of Pittsburgh, second. Third place man not shown in photo.—Hammond is sprinting in good style, but has failed to use his arms to advantage. His left arm should be well forward and elevated and his right elbow should be drawn in toward his body and at this point should be to the rear of his body. Shea, on the extreme right, is using a correct running style rather than sprinting form. Bossert is handicapped by a slight shoulder shrug. His right arm is also out of position. Brown, running in the second lane from the pole, is using a full armswing rather than a short choppy arm action. The full easy armswing is a part of the stride action and is permissible during certain sections of the 220 race, but this event should always be concluded by a definite sprint action. In Hammond's case it is possible that the camera caught him in a between-strides position. If this is the case, both arms are approximately correct, but for perfection should

erally the indoor competitor does not allow himself as much time to get in shape as he would for outdoor work.

A great deal of stress has been laid on the necessity of carefully leading up to speed sprinting and speed starting. The primary reason for this is the need of carefully guarding the muscles during the early cold outdoor season. Indoor athletes usually do not require this slow preparation, owing to the semi-tropical, heated condition of the buildings in which they train and compete.

Brown of Princeton, Maxam of Pennsylvania and Hendrixson of California, running one-two-three at the finish of the 220 yard race, Intercollegiate championships.—Brown in the middle and Hendrixson on the right show a flat-footed landing and Maxam on the left shows a tendency to follow their example. Scientific sprinting does not countenance other than a ball of the foot or toe landing. A sprinter should be well up on his toes in the shorter races and his heel should never come in contact with the track in any of the sprint or middle distance events. The foot action changes with the longer track events, in which it is permissible to make a landing on the ball of the foot, which is succeeded by an easy dropping of the heel to the track. The drive in any event is always made from the toes or the ball of the foot. The competitors also show a lack of body lean—and a consequent absence of driving traction. Their arm action is negligible. Hendrixson shows an upper body strain and a chin lift. All of them are kicking up behind to an unwarranted degree—considering the shortness of the race and the need for fast action.

GENERAL TRAINING RULES

The first point to be emphasized is the necessity of living a regular life, especially during training. An athlete must always take care of himself in his daily life. If he does not, it will certainly betray him sooner or later. Any trainer of experience is in a position to observe these things. On the other hand there is no danger of ill effects from training so long as the athlete follows systematic methods in moderation.

If all the parents who now forbid their sons to train could see what assistance and health this training brings them—when carried on sensibly and under careful direction—most of the boys would be allowed to train instead of being forbidden, as is now often the case. Training and athletic games help more than anything else to keep the young men away from mischievous pleasures and bad company. Young men who have training to do during their free hours cannot waste their time in idleness or vice.

All those who train with the idea of winning prizes on the athletic track should always remember that the brain plays an important part in training itself, as well as in contests. The man who knows how to combine his intelligence with his muscles and nerves always will be the winner. An athlete needs not only to have all his thoughts clear in his head, but he must also know how to use these thoughts in the right way and at the right time. Many are the victories that have been lost by good athletes just because they did not think quickly or accurately enough.

Howard Drew finishing up a sprint in perfect style and about to breast the tape while sprinting at top speed. In spite of his supreme effort he is holding his form. Note that his upper body is held well forward and that he is running without body strain. His right foreleg and foot is pointed straight ahead and the foreleg is coming down with a slight chop. The position of the rear left foot particularly deserves a close study, as it is on a level with the front knee and is in a position to be brought forward without loss of time. The second sprinter from the right, or pole, is running in good form save for the extended right arm, which is thrown to the rear. As has been pointed out, the sprinter's hands should never go to the rear of the body and the arm should always be flexed at the elbow. Note that his "knee lift" action precedes the foot and foreleg action in making a stride.

Always remember to have all your thoughts collected, whether it be in training or during the actual games.

Another important thing to remember when taking part in an athletic meeting is not to pay too much attention to what is said about your opponents, or what they themselves say. This kind of talk is done very often only to alarm you and should they succeed in this their chances of winning are certainly increased. When other competitors try this and attempt to make you nervous by talking of such and such a man's fine results, etc., believe that they are saying all these things just because they are afraid of you. With this frame of mind you will become much calmer, and will be much better fitted for the event in which you intend to take part.

The object of training is to get the whole body into such a condition that the athlete is ready to give an exhibition that will tax his energy and strength of will without danger of overstraining.

When training, therefore, you must learn to obtain complete control of your nerves, as it is just the nerves and your strength of will that win for you in the final struggle.

To get the body into the best condition you must train systematically. Training can be carried on every day, with one day of complete rest every week. Such training would, of course, be too much if you used all your strength and energy every day of your training, and the result of this would be that you would suffer from the so-called "overtraining." You should therefore train so that you do not feel tired after your work at the training ground, because then the muscles lose strength and elasticity instead of

Intercollegiate A. A. A. A. championships, second heat, 220 yards run; M. M. Kirksey, Stanford, first; R. G. Davidson, Cornell, second; S. H. Feldman, Yale, third.—Note the rear foot position of the various competitors, only one, the Cornell runner, shows a slight kickup behind. Kirksey is striding in particularly good form. He is using a long easy armswing, which is permissible in striding and running, but is not recommended for sprinting. He is using a combination of hip and knee action and a certain amount of shoulder swing. Note the position of his rear leg and foot. Compare his vigorous arm action with the arm position of his competitor on his right. It is evident that the latter is depending largely upon his leg action to carry him through to the finish.

gaining these qualities. Overtraining may result from these two causes. One is that the muscles have been so strained that they cannot complete the work that hard training requires. Overtraining does not come very often from this reason. The other reason is that the brain has become fatigued from too long a period of competition, so that the athlete cannot concentrate his energy and strength of will on his work.

In general the athlete has the idea that he should keep quiet and rest as soon as he discovers that he is overtrained. This is not the best method of treating the matter. Overtraining shows itself most by the muscles becoming hard and stiff and losing much of their elasticity. Then the results obtained by the athlete deteriorate and his keenness lessens. As soon as you notice these signs you should endeavor to keep the body in condition by means of long walks. Do not think of your training and what the result will be if you do not recover soon, as this will be too great a mental strain.

The feeling of health which you have after training regularly, taking baths frequently, dieting and taking massage, together with regular sleep and plenty of fresh air, is the best proof of the value of training.

A few words of advice to our young athletes about taking care of themselves while in athletic costume would not be amiss at this time.

At every set of games one can see quite a number of the boys standing and sitting around, both before and after their events, who have little or no extra clothing over their track uniform to keep themselves warm. They do not realize how dangerous such a practise is to their present and future health.

R. C. Craig of Michigan, intercollegiate and Olympic champion, winning a 220 yards run. Craig's form in this picture is marred by a side twist of the body, diagonal sidearm action (often used at the finish) and a lack of forward body angle. It indicates the correct action of the rear leg and the permissible elevation of the rear foot. It also shows the correct foreleg action, or the position of that portion of the leg from the knee to the foot when the stretch stride is used. His competitor on his right is using perfect running angle and knee action. His upper body is also free from tension. His left arm, however, should be held in toward the body, rather than away from the body, as indicated in the illustration. The second runner from his right has the same left arm fault. The third man from his right is finishing up in good style, save for a slight body twist. His right arm position illustrates the correct placement of the arm and hand. His left elbow should be drawn in closer to the body. The runner on the extreme left is also handicapped by a body twist which throws the body off balance and interferes with traction. All of the competitors, save the winner, are using the recommended straightahead arm action.

One of the first things that coaches, trainers, and other heads of athletic bodies should do is to teach their charges how to take care of themselves, for what is the use of developing the physique now, only to have that same body collapse later in life from rheumatism and other organic troubles, brought on mostly from a series of colds and thoughtless exposure during their athletic career?

Too often do we hear about this one and that one whose death has been blamed on athletics, and yet how many athletes are there of thirty or forty years ago who are enjoying good health and sound mind, simply because they knew the value of taking care of themselves, and *practised it.*

A few don'ts might help the new ones to at least enjoy their sport, even if they never break their novice.

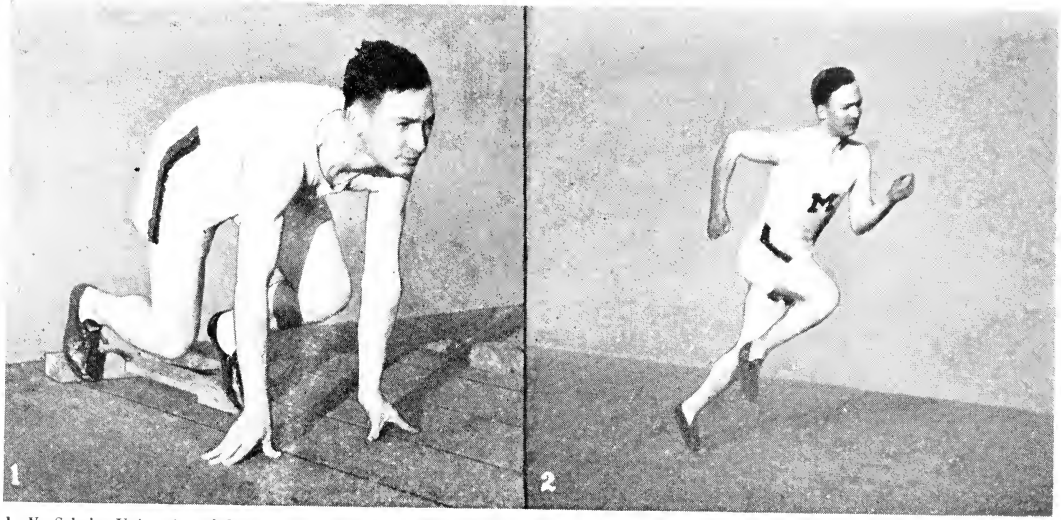
Don't stand on cement or stone floors in bare feet, use an old towel or newspaper.

Don't use *cold* water showers or plunges right after competition, if you do not feel an instant reaction, no matter what the weather is, and remember that it is more advisable to get used to competing on an empty stomach than a full one. Practise moderation.

Don't stand around before your event *uncovered.*

Don't stand around after your event *uncovered;* get dressed *at once.*

A good bathrobe that comes to the feet should be part of every athlete's track kit, and it will eventually prove that the added bulk of his grip will warrant his carrying it around.



J. V. Scholz, University of Missouri, co-holder Conference 220 yards record, illustrating the "Get set" position and sprint action. The short footspread shown in this picture has been approved by a great many sprint experts and has been successfully used by a number of champions. It is to be preferred to the old style long footspread, unless the sprinter has exceptionally long legs. The position shown conforms in most details to the position recommended. The position could be improved by raising the rear knee slightly and by turning and spreading the fingers so that the thumb and little finger are farthest from the start line; in tripod fashion. The sprint action shown is particularly good. Note the perfect body angle and the body poise. The knee elevation is well taken care of and there is a noticeable lack of tension. The arms are being used to advantage. The right hand has been drawn slightly too far to the rear for sprint action, the movement being downward to a point close to and opposite the hip. A great deal has been said about the presence or lack of body angle, in connection with the description of the illustrations in this book, therefore the novice sprinter, runner or hurdler will do well to closely examine the picture for that phase of sprint action.

INDOOR RUNNING

Under favorable conditions, indoor running does not differ from outdoor running. Under certain unfavorable conditions, a vast difference prevails. A correct analysis, therefore, demands that specific instances must be cited. As a general rule, indoor running calls for a modified type of outdoor style, with certain mechanical additions. Certain phases of it may be rightly compared to the "trick" mechanical action that is used in baton passing in the relay.

Indoor competition may be divided into two branches, straightaway running and curve running. The former, under ideal conditions, should not slow up an experienced outdoor performer, after a little practise; the latter, on the other hand, is more than apt to cause disaster.

Most sprint champions possess sufficient weight and strength of leg muscles to make use of a downward leg drive, assisted by a similar arm action. This action will produce the best results when the track is "springy" or possessed of resilient qualities. Hence, the same type of runner requires a "live" indoor track if he is to obtain the same results. Only a few indoor tracks possess this advantage, by reason of the underlying foundation or type of lumber used. The boards must be of equal strength, properly bolstered, with just enough spring to produce an even reaction after each stride, sufficient to take the spikes, yet hard enough to prevent chipping or "catching."

The best start can be obtained only when start holes or starting blocks are provided; therefore a flatfooted

Finish of 220 yards run, Michigan vs. Chicago dual meet, 1903. Won by Archie Hahn, University of Michigan; Clyde Blair, University of Chicago, second. Time 21 3-5 seconds.

start may be classed as an unfavorable condition. The latter requires that the runner place his feet close together and, lacking a rear support for his feet, he is obliged to come to an upright position with his first stride, as any attempt to make use of the full forward "fall" or body lean, would have a tendency to throw him forward on his face. It is an admitted fact that a gradual resumption of the forward lean in from three to five strides is a fundamental of the sprint start.

Only a few indoor meets are held on specially constructed tracks, armories being usually the scene of indoor events, and on these floors the use of spike shoes is generally prohibited. The absence of spikes presents the greatest handicap to the indoor runner, as the mechanical stride, including the abbreviated start stride and the full stretch stride, is based on the ability of the shoe spikes to hold the foot position without slipping. The full forward body lean and the resultant foot drive and traction are made possible by the firm purchase of the spikes.

Certain minor points, such as having sufficient space in which to slow up after passing the finish line and a normal lane in which to run, often may prove to be important factors. Some runners find it hard to maintain a maximum amount of speed up to and slightly past the finish line when sufficient finishing space is not provided and all competitors require a fair amount of leg and arm room while running.

"Closely-coupled" runners—the compactly built or moderate size of athlete—of middle height or under are usually best adapted for the indoor type of competition, all other points being equal. Constant practise will eliminate this

R. C. Craig, intercollegiate and 100 and 200 meters Olympic champion. Excellent finish action. Intense vigorous momentum with a minimum of body tension. A sprinter usually shows tension in the neck muscles by a lack of body angle or by throwing the head to the rear and cutting off the wind. It is also evident that the runner is chopping down on his foreleg action to a certain degree. His knee action is of the desired straightahead type and his right foot is pointed toward the finish line and will land squarely, so that the desired traction can be obtained. The majority of sprinters, as is clearly shown by the various pictures presented in this book, apparently abandon their mechanical form during the last ten yards of the race, the very time when it is most needed. If this is a chronic habit it can best be overcome by a definite mental concentration. The position of Craig's arms illustrates the usual finish style when the race is finished without a final jump.

physical handicap, however, if it is attended by a complete understanding of the desired fundamentals. Curve running becomes increasingly difficult with additional laps to the mile, some of them requiring even as many as twenty to the mile, with little or no straightaway to relieve the constant maintenance of artificial balance. A tall, flexible runner will naturally run to better advantage on a straightaway with occasional turns, unless he develops a compromise action suitable for the curves. A stocky sprinter, by reason of his natural shortened stride, is able to "patter" around a sharp curve with little diminution in his speed, as his balance is less liable to be disturbed.

An indoor sprinter who competes regularly should have a working knowledge of circular tracks, with a continuous outward rise; flat tracks, with a substantial straightaway and a sharp, flat turn; and the same type of straightaway and curve track, with either partial or fully banked steep curve.

Making the most of the straightaway is a fundamental of indoor running and failing to hit the first half of the curve after leaving the straightaway is responsible for a large amount of "grief." The novice must remember that his arm-and-leg action on the straightaway is designed to produce a straightahead action; therefore, it follows that the same action, plus an even body balance, will not work to advantage on a sharp or gradual curve.

As a general rule, most runners slow up a bit when hitting the curve, that is, during the first half of the curve, and then release their brakes as they swing around at the half-way point of the curve. A few have demonstrated their ability to maintain an even pace regardless of the

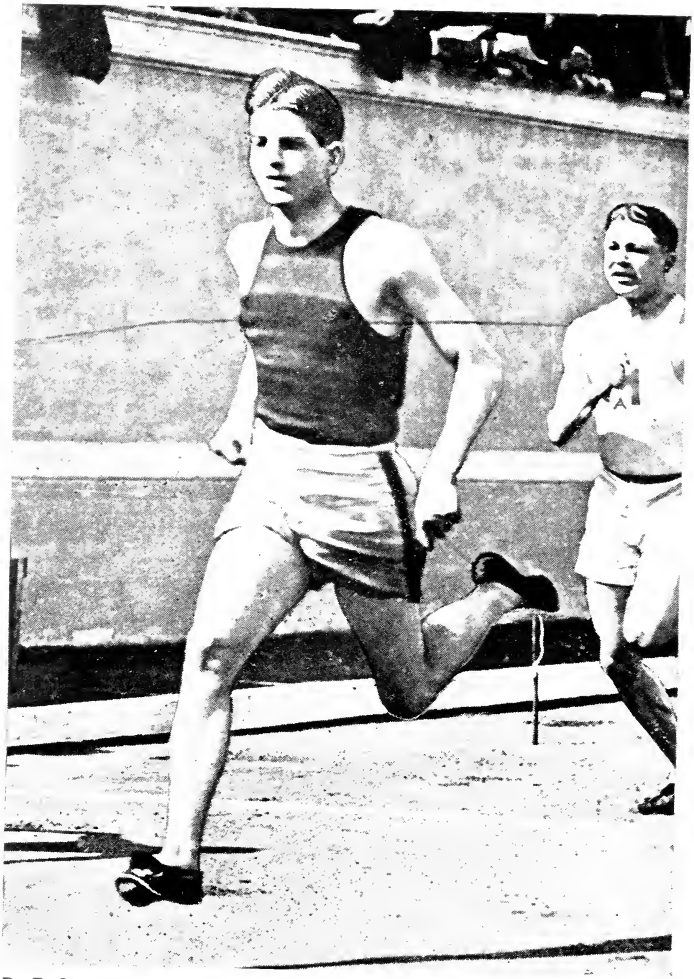
Charles W. Paddock of the University of Southern California, equaling the world's record for the 100 yards event; M. M. Kirksey, Stanford, second; time, 9 3-5 seconds. —Kirksey is running rather than sprinting. The picture shows a partial loss of body angle and a wasteful kickup action on the part of the rear leg. The foot is almost even with the thigh, whereas it should not come above knee height. When this exaggerated kickup is used, the heel of the foot tends to strike the runner's body and the foot from the heel to the toe takes a position parallel with the ground. An easy test for foot position may be had by looking around at one's rear foot; when it is in a correct position the runner cannot see the bottom of his shoe. His left hand and arm should be ahead of the body and his right elbow to the rear of the body and in a straight line. His shoulders are relaxed, but he has thrown himself slightly out of alignment by looking toward his competitor. Paddock is using a "jump" finish, but has retained his general form, save for a slight head twist. He is using a full foreleg stretch and his rear foot is held at the proper height. There is no indication of improper body tension.

curves, and it must be admitted that it is possible, by a judicious application of mechanical body action, to accomplish such a result. The novice, however, should be satisfied to follow the general custom in this respect, unless his physical conformation is such that an easy accommodation to the handicap is immediately possible.

From a theoretical standpoint it is best to hold closely to the inside lane or pole whenever it is possible. Formerly it was considered quite an advantage to run high on the first bank of the curve, veering in slightly until the middle of the curve was reached and then cutting down toward a pole position. This was based on the theory that it enabled the runner to maintain top speed while making the turn and that any loss of speed while going up the bank would be made up on the down trip.

It is true that this theory is sound in a great many respects, although the modern coach has come to believe that it is best to cling to the inside portion of the track, because a minimum distance is covered when this rule is followed and then, too, an athlete is liable to get a jolt going on or coming off the banks, with a possible complete loss of balance or a temporary loss of equilibrium.

As has been stated, the usual arm-and-leg action is designed for straightaway running, and if this sort of form is maintained with speed as the curve is taken, it will tend to throw the runner to the right and off the track, if it is a flat curve, or upset him, if it is a banked curve. There are several mechanical styles which are of great assistance in this respect. It is recommended that the novice try all of them, supplementing these movements with original experiments, as each runner is subject to a number



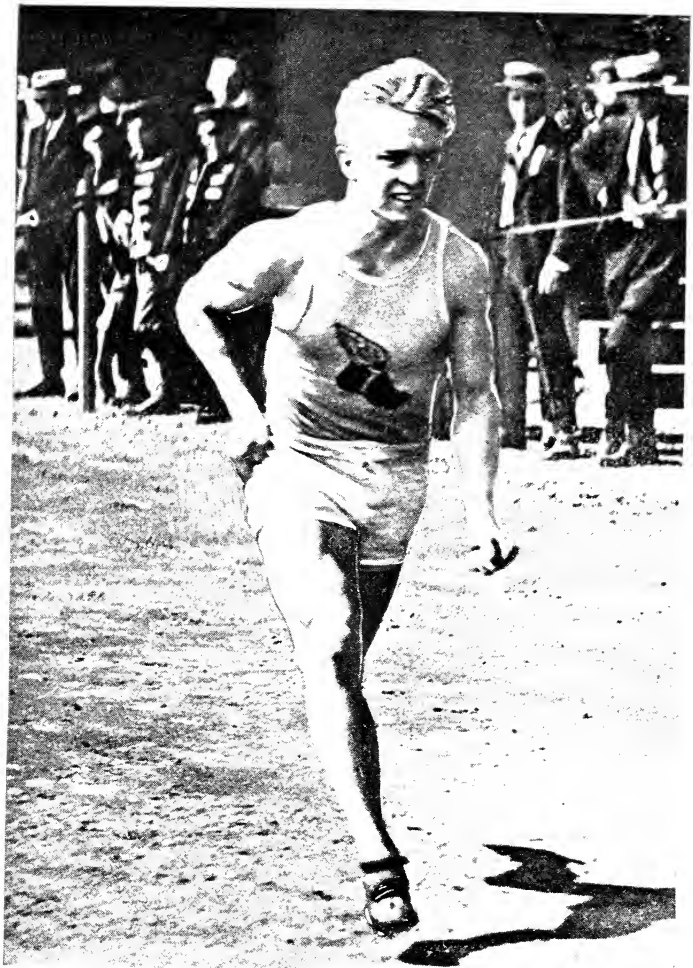
D. F. Lippincott, of the University of Pennsylvania, intercollegiate and Olympic champion and former co-holder of the world's 220 yards record. Illustrating the remarkable striding ability of this champion. For perfection of form, the left hand and arm should be extended forward to a greater degree. The absence of body tension is very noticeable. The leg action is also easy and effortless. Naturally, in striding, the rear foot may be kicked up to a higher point than in sprinting.

of "exceptions-to-the-rule" and no one general rule can be applied to an army of runners that differ radically in physical build.

A simple method is that of "braking" the inside-arm action and exaggerating the outside-arm swing. A short, inside, circular arm action, supplemented by a full forward outside arm, will effectually serve to keep the body turned in the right direction. The left arm action (inside) should be performed opposite the left hip and the right arm circular action should be rather in front of the body. This tends not only to throw the right side of the body around ahead of the left, but also aids in the maintenance of a forward body lean. At all events, dragging the inside arm action and swinging the outside arm a bit in advance of the body will prove a big help regardless of the form used.

Another method of taking the first curve and holding to the pole position is that of bending the upper body sharply inward and forward from the waist just prior to the circular swerve. This forward body bend can be gradually relaxed as the middle of the turn is approached so that a normal running angle will be present when the second half of the curve is negotiated. The amount of the body bend and inward lean will, of course, depend upon the presence or lack of a "bank" or slope. Anyone familiar with motor cycle racing on saucer tracks will realize that it is impossible to maintain an upright position on a banked incline. This point must be observed when a similar curve is taken by an indoor runner.

As has been stated, a runner should chop his stride slightly when taking a curve, as a slight miscalculation in point of stride may not only produce a temporary loss of



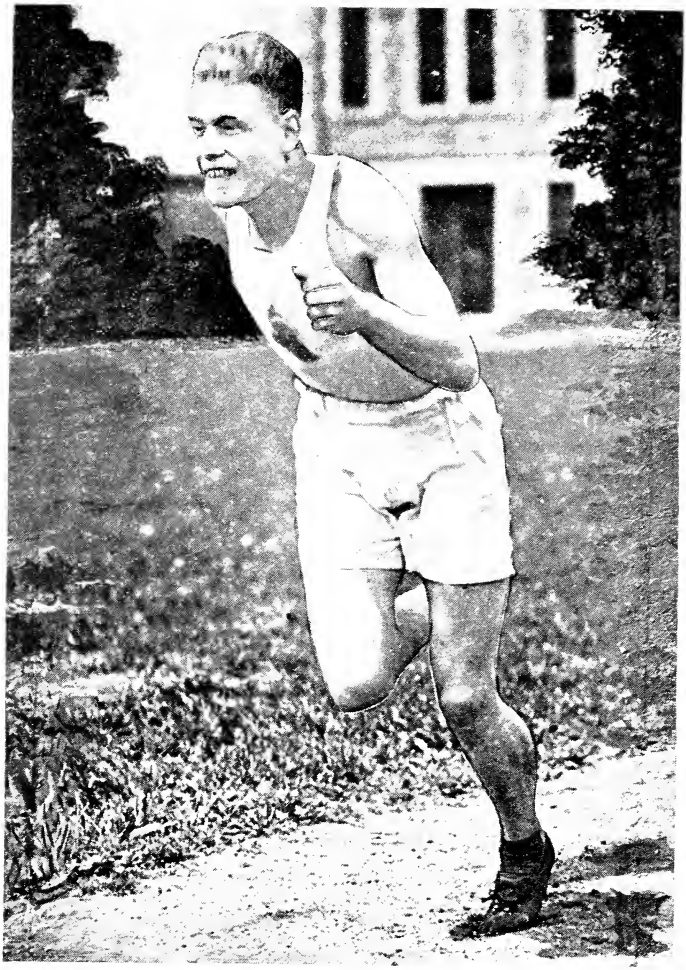
Loren Murchison, All-America champion sprinter. Murchison is striding easily in this picture and is using an easy armswing action. His left hand should be elevated to a higher point for effective arm assistance. He is running without body tension and with a proper body angle. His left foot has been kicked up behind to an elevation that will handicap the speed of its subsequent return on the following stride.

Copyright by Underwood & Underwood, N. Y.

balance, and a loss of favorable position, but also may ruin a runner's confidence in himself. Self-confidence is a valuable asset in all racing, but particularly essential in indoor curve racing, as individual lanes are not used and each runner if he expects to be successful must consistently fight for a lead position.

When a runner uses a full stretch stride, he leaves himself open, so to speak; whereas a chopped slightly spread stride gives a better command over the body and there is less likelihood of an over-stretch or consequent stumble. Then, too, a long-spread runner is subject to a "jump" from behind on the part of a competitor possessing a fast abbreviated leg action. Many runners do not chop their strides when hitting the curve, but ease up slightly, so that they "coast" over the first half (or quarter) of the curve. This sort of relaxed stride action is always effective and, incidentally, rests the runner, as well as being a means to an end.

An indoor runner should bear in mind the abbreviated length of his shoe spikes. For this reason he necessarily will have to cut down the length of his stride slightly, so that he will land on the ball of his foot. An outdoor runner can land or drive off the forward part of his foot and the long spikes and soft track will enable him to maintain a more favorable grip. An indoor runner must bear this point in mind at all times, when wearing short spikes or when he is forced to run without spikes. Shoes without spikes make necessary a foot style that may be said to resemble flatfooted running. The landing is always on the ball of the foot, however, although the heel may be close to the surface of the track.



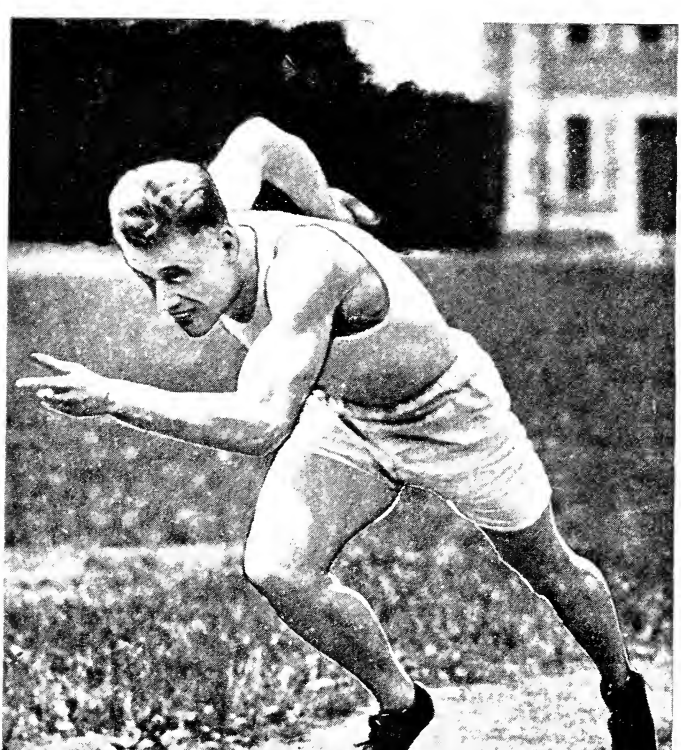
An improper "come-out" from the marks, showing the athlete bolting upward as the first stride is taken. Few sprinters cultivate this mechanical action to a sufficient degree. The arm should go well ahead with a great deal of vigor so as to throw the body forward. The illustrated arm position tends toward an erect position. As in high jumping the sprinter must let his entire body go forward so that the rear sustaining leg will be fully extended. A conscious mental effort will assist the athlete to get away properly.

Most coaches recommend a running stretch style, or a light landing style, rather than the down drive or "pound" style. This is a matter that must be decided by the type of track and the individual style of the athlete. There is no reason why the "pound" style—so-called—admittedly of great value in outdoor running, should not be used to equal advantage under favorable conditions when applied to indoor work.

Indoor racing around curves is essentially of the fast and furious type, and often becomes slightly rough, in comparison with outdoor competition. This is due to the fact that the restricted width of the track places a premium upon a leading position so that every competitor is constantly striving for the place when there are a number of runners. Although the rules prohibit interference of any kind, it becomes well nigh impossible to eliminate a certain amount of arm swinging and elbow jabbing, particularly at the start, when everyone is striving to obtain the pole.

The indoor runner must be brimful of confidence and aggressiveness and when running must use his ears and eyes to advantage. He must learn to act instinctively and automatically; an advantage once lost can hardly be regained by reason of the track limitations, if the race has a good entry. For the foregoing reasons it is recommended that every sprinter who expects to compete in curve running should devote a large part of his time to practising his start and preliminary stride action, as the ability to get away well in front is often equivalent to a win when the race is of short duration.

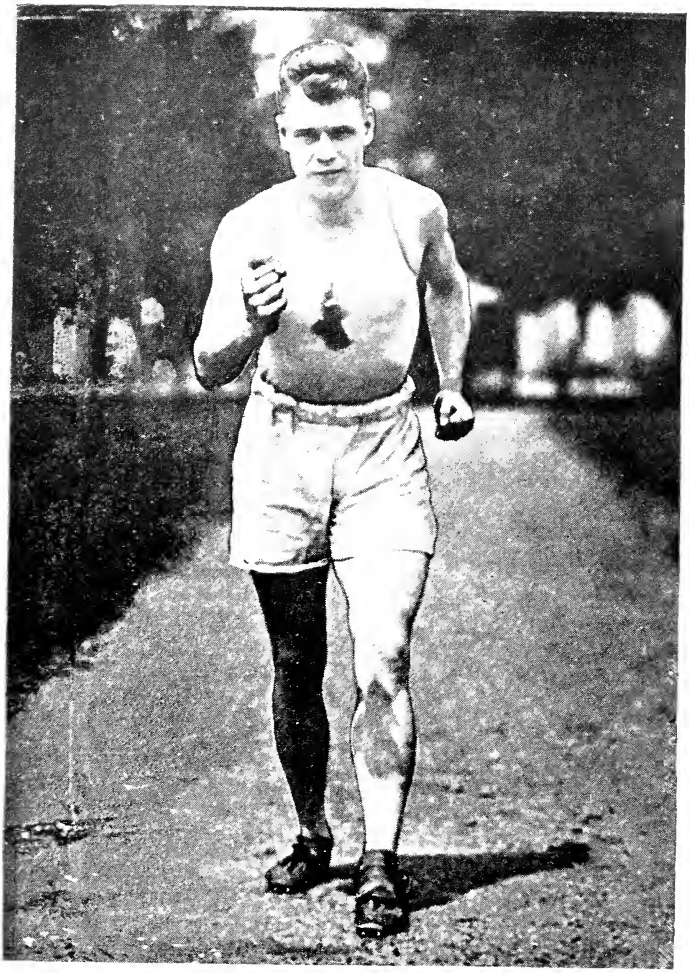
Generally speaking, it is suggested that the indoor novice should pay a great deal of attention to the mechanical



Illustrating a vigorous "come out" from the marks. Here the sprinter is seen bringing the rear leg forward, moving upward and away from the hole in the strongest manner possible. The arm action is equally forceful and blends nicely with the leg action. The hand should be semi-clenched rather than extended, as shown in the picture. Note that the right foreleg is being chopped down to obtain the first short stride and that the athlete is maintaining a full forward body-lean. The forward arm action assists in the forward momentum and the rear arm is in a position for a full swing forward as the rear leg comes up on the second stride. The coming-out action is a forward and upward movement, and not the upward action used by the majority of sprinters and runners. The forward angle, shown in this picture, will be gradually reduced to the normal running angle in approximately three or four strides. Success at this game is dependent upon the speed and force of the forward arm swing.

factors that go to make up outdoor running, paying particular attention to body balance and the ability of the arms to deflect the course of the body. His footwork should also come in for considerable attention. In this respect it should be noted that running on board tracks has a natural tendency to produce "shin splints" (see chapter on "Keeping the Athlete Fit") and bring about a great deal of unnecessary muscular soreness and pain.

The novice can best prepare himself for indoor competition by observing the ordinary rules of common sense. He can hardly expect to dash out on the track without any preliminary training and go through a strenuous workout without being partially or entirely crippled for a few days or weeks. As in outdoor work, he should approach his work cautiously and give his muscles a chance to accustom themselves to the strain by slow degrees. If his preliminary workouts are handled in a judicious manner he will eliminate most of his muscular trouble without any loss of time. The early workouts should include a great many bounding exercises so that he will be able to land without a jar, for without this lightfooted landing, he is bound to shake up his entire muscular framework. It is essential that each race and practise jaunt be appproached in the same careful manner, if pulled tendons and tied-up muscles are to be avoided.

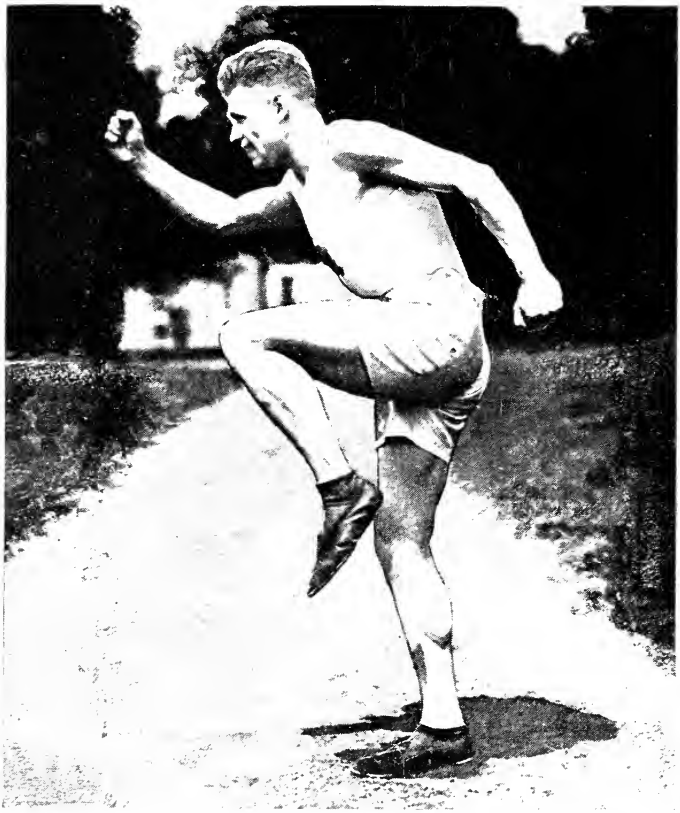


Showing a front view of the arm position while sprinting. The right hand will operate from this approximate position or from a point opposite the shoulder or chin. This picture also shows the flexed left arm and the elbow going to the rear. The inner portion of the entire arm retains a position close to the side of the body and at no time should the arms be allowed to swing away from the body, a common sprinting fault. The shoulders should maintain a relaxed position and properly should not deviate from the position shown, by dropping to the rear or going ahead with the forward or backward arm swing.

EARLY DAYS OF ATHLETICS IN THE UNITED STATES

The following interesting accounts of methods of starting and running and some of the tricks by which professional footracers separated the gullible from their money in the early days of athletic sport in America are taken from an article on "The Infancy and Childhood of Amateur Athletic Sport in America," written by the late William B. Curtis, one of the founders of the New York Athletic Club, and one of the foremost characters in American athletics, both in the arena and as an executive.

Mr. Curtis, who was also one of the founders of the Amateur Athletic Union of the United States, was affectionately known as "Father Bill." He excelled in almost every department of athletic competition from sprinting to heavyweight lifting; a record for the latter—3239 pounds, with harness—at New York, in 1868, still stands. He was an indefatigable walker and skater, and though well past sixty, kept up his love for the open. Mr. Curtis lost his life in a storm on Mount Washington, New Hampshire, on July 2, 1900, together with a companion, Allan Ormsbee, a young man of Brooklyn, N. Y., while on a holiday tramp over one of his favorite White Mountain trails. The complete account from which the following extracts are taken was written in 1899, a year before Mr. Curtis' death, but was not published until many years afterwards, when it was printed in the New York Athletic



Illustrating the pullback action of the foreleg, which is sometimes productive of poor striding results. The pick up action with this style may be fast, but the expenditure of power is offset by the loss of stride length. This exaggerated chop is used to advantage when the sprinter is coming out of his marks and particularly during the first two strides. As the race advances, however, the chop becomes less noticeable, although a semi-chop is one of the fundamentals in sprinting. Throwing the foot and foreleg directly outward from the position shown on the preceding page will produce a full stride effort, such as is used in middle distance and distance running. The sprinter must therefore realize that there is a happy medium between the chop down action, illustrated above, and a full forward stretch, of the type which has been shown in many of the preceding action pictures. As soon as the landing foot reaches a point ahead of the upper position of the body it inevitably must produce a lack of traction. Sprinting is not merely a question of foot pickup, but it demands the athlete be well ahead of the landing foot if a maximum amount of traction and forward momentum is to be obtained from each successive stride. The length of the foreleg stretch should automatically be established by the ability of the sprinter to maintain a correct body angle.

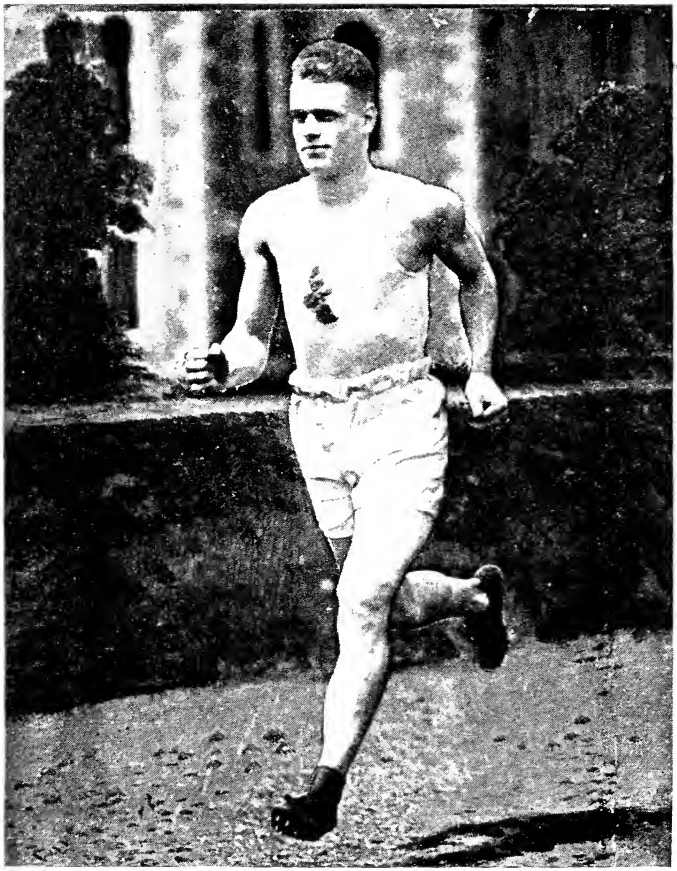
Club Journal, and reproduced here through the courtesy of the club.

"During the early years of American amateur athletic sport, all the methods of management were naturally copied from the professionals. Running was limited almost entirely to matches, as there were no open competitions in which athletes could enter, and the distances were in nine cases out of ten one of the two extremes—one hundred yards or ten miles. As there were but two starters in these match races, the methods of getting away were more primitive than at present and had been cunningly devised by veteran professionals to give the expert an advantage over the novice.

"Several styles were in common use, the oldest being what was called the 'break start.' The judge stood on the starting line, the men went back fifteen or twenty paces, stood side by side, joined fingers lightly and trotted up to the judge. As they passed on either side of him, his body broke the touch of their fingers and they dashed away at full speed. If the judge thought the start fair, he said nothing, but if he thought either man had an unfair advantage they were recalled.

"This method was subsequently doctored into the 'lead pencil' start. Instead of touching fingers, each man held one end of a lead pencil or short stick and started much as in the original style, dashing away just when the pencil or stick touched the judge's body, and being subject to recall if the start was manifestly unfair.

"As the men's hands were so close together and their bodies must necessarily have been almost if not quite abreast as they passed the judge, it would seem to those



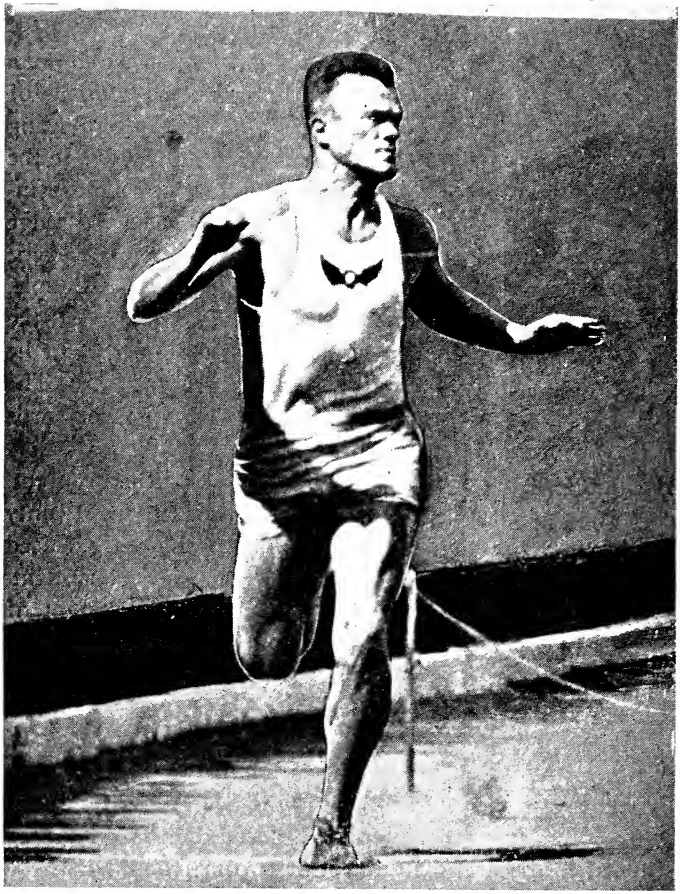
The illustration shows an easy stride action and the correct position of the arms and legs for this exercise. The foot action indicated is recommended for all-round sprinting and running exercises. A correct foot landing permits a firm purchase and gives the necessary traction. This cannot be had when the foot is thrown out of alignment. The track and field athlete must realize that the toes and the ball of the foot have a definite part in sprinting and running and that the proper placement of the feet will allow a full usage of the shoe spikes and generally aid in the forward momentum. The sprinter should examine his footgear from time to time, as he will unconsciously favor the inner or outer side of his shoe. The sprint shoe should fit snugly, otherwise the forward spikes will never be called into play and their presence may prove to be a hindrance.

who never experimented with this start that neither man could gain an appreciable advantage, but the cunning of professional runners had devised methods of outwitting inexperienced opponents. A few steps from the judge the expert would slacken his trot and the other almost invariably would do the same. Just as he reached the judge the expert suddenly would quicken. As it required some fraction of a second for the other to follow this example, the men would pass the judge almost exactly abreast, the expert more than likely a few inches in the rear, but he would be running, while the other was only trotting. The advantage thus gained would amount to two or three yards in the first twenty-five yards of the race.

"A more complicated style was the 'mutual consent' start. A line was drawn across the track, fifteen or twenty feet behind the starting scratch. The men were placed between these lines and told to start by mutual consent, and whenever both men touched the ground in front of the starting scratch at the same time with any part of their persons it was considered a start.

"A race of this kind between two experts was amusing. The men stood between the lines facing each other, pranced up to the starting mark sideways, and the one who was ahead would put his foot down over the mark, hoping that the other would follow. If he did, it would be a start, with the first man a foot or two in front; but if the second man did not like the start, he held back, did not put his foot over the mark, and the first man was ordered back for a fresh trial.

"Starts of this style frequently lasted over an hour, especially if one of the runners was not extremely anxious



M. M. Kirksey, Stanford University and Olympic Club; collegiate and Olympic champion. The position of the landing leg indicates that he has chopped his foreleg stretch in the proper fashion, although the right leg appears to be kicked up behind above the permitted height. The picture also shows a letdown in momentum and a side-twist toward his competitor. Such tactics will often allow an aggressive trailing sprinter to win out at the tape. A short sprint man should always run at full speed to a point beyond the finish line and he should never deviate from a straight-ahead position. Note flat-footed landing. Copyright by Paul Thompson, N.Y.

for a race, and eventually this system was modified by inserting in the articles of agreement a clause substantially as follows: 'Start by mutual consent; if not off inside an hour (or some other specified time), then to start by pistol.' Resort to the pistol was necessary in so many cases that it gradually supplanted the mutual consent system, and became the customary way of starting sprints.

"The expert found it easier to outwit the novice in the mutual consent start than in the older 'break' start. The ordinary method, which was almost invariably successful, was as follows: After two or three purposely ineffectual starts, in which the expert would get over the mark so far in front of the novice that there was no chance of the rear man following, the expert would hang back as they neared the mark, allowing the novice to reach the mark a few inches, or even a foot, in front, and he usually thought this a fine opportunity to step over. But just after the expert slowed he started again at quickened speed, and followed the novice over, with the result that although a few inches behind as both got over the mark, he was fairly in his stride and moving at a three-quarter speed, while the novice was still partially turned sideways and not yet fairly running. Of course, the novice lost.

"These professional wolves usually traveled and prowled in pairs, one going first to a town, securing some employment, exhibiting his proficiency as a runner to a select few, and finally making a match with and beating the local champion. Then the winner would explain that he knew a man in a neighboring town who thought he could run, and whose friends would back him heavily, but who really was several yards slower than championship

Howard Drew running the 100 yards in 9 4-5 seconds. At the 60 yards mark. The position of Drew's arms and hands indicates that he is making no use of them and that his speed at this stage of the race is entirely dependent upon his powerful leg drive. The picture also shows a touch of neck strain. The sprinter on his right is using excellent knee action and has the proper amount of body angle. His head has been tilted backward slightly and his left arm is thrown too far to the rear. The position of his right arm shows the usage of the diagonal armswing across the chest, a style favored by a great many sprinters.

speed and could be beaten easily. Negotiations would be opened with the stranger and a match arranged. All the men who had won the first race wished to double their gains, while those who lost were anxious for a chance to get even, so the betting was heavy. The stranger won, of course; the town was pretty thoroughly cleaned of spare money, and the partners changed their names and moved to fresh harvest fields.

"If, after beating the local champions in races on even terms and under ordinary conditions, any money still remained in sight, the professionals tried to secure it by offering contests on novel terms, and with such conditions as seemed to the uninitiated, foolhardy and sure to lose. One of these was called the 'lying down' start. The novice stood in his usual position, while the professional would lie flat on his back, with his head at the scratch and his feet pointing away from the finish, and the race started by pistol shot. To men unacquainted with this trick, it seemed as if the novice must win, and elderly know-it-alls, standing about, shifted their quids and wisely drawled out: 'Why, Jimmy will be down to the other end before that fellow gets started.'

"But it did not work that way. When the pistol sounded, the professional turned on his face, rose to his hands and feet, and found himself in the attitude now universally adopted by present day sprinters (the crouch start), and which is much better than the oldfashioned erect position. This preliminary movement cost the professional about half a second, or five yards, and as this was about half the handicap, he could beat the novice in 100 yards. He usually caught his man near the seventy-fifth yard mark.

Charles W. Paddock winning the 100 yards run in Western tryouts for 1920 Olympic team. Time, 9 4-5 seconds.—A study of Paddock's finish reveals the fact that he uses the jump finish on certain occasions with remarkable success. A few champions have made this jump a permanent fixture of their race, but Paddock apparently uses either style with equal success. If such a jump appears to be a natural sequence to the final spasmodic effort to gain the tape, its adoption is allowable, otherwise the standard "on the ground" finish is recommended. His competitor, in this photograph, has retained his forward body lean and is running without body tension. His lack of arm action may be explained by his evident desire to breast the tape in the customary manner, using the upflung arm finish.

"Another favorite game, especially in smaller towns, was the 'fence rail' race. The novice stood on the mark as usual, while the professional went back twenty or twenty-five yards, and carried on his left shoulder a fence rail borrowed from the nearest rail fence. This rail was nicely balanced on his shoulder and held in place by the runner's left hand, while his right arm was left free. The race was usually fifty yards, rarely more than sixty yards, unless the novice was notably slow. The conditions were that the professional should move up as he pleased and take a flying start, while the novice stood on the mark and did not start until the professional reached the mark and the judge said 'Go,' or fired his pistol.

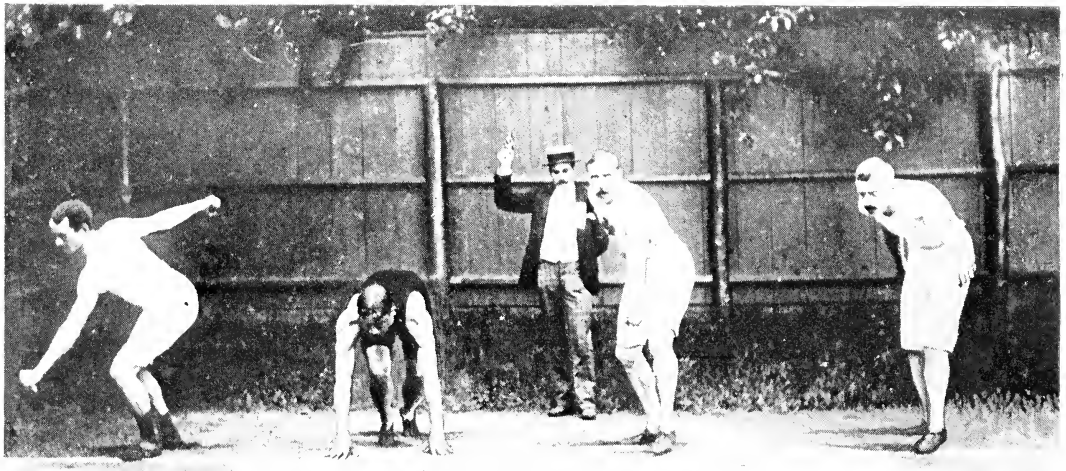
"This match, as in the 'lying down' start, looked to the uninitiated a sure thing for the novice, but he really had no chance, as with two men of equal speed, the rail bearer would frequently beat the other. When the professional reached the mark he was running at full speed, while the time needed for the judge to see him at the mark and give his signal, and for the novice to hear the signal and get in motion, used up the larger part of a second, and the result was that the professional had seven or eight yards start, which was quite enough to make a fifty or sixty yard race sure, as the rail would not delay him more than six or seven yards in the distance.

First public appearance of the "crouch" start in America, at the Rockaway Hunt Club games, Cedarhurst, Long Island, N. Y., May 12, 1888. From left to right, the runners are: S. Derickson, Columbia; S. J. King, Princeton; F. B. Lund, Harvard; C. H. Sherrill, Yale. The latter was the first to use the crouch. C. D. Turner was starter. Nothing like it had been seen by those present, and one newspaper account of the race stated that "although Sherrill seemed to stumble at the beginning of the race, he nevertheless recovered himself and won."

ORIGIN OF THE "CROUCH" START

A feature of the early athletic meetings in New York City was the exhibition of the two-wheel velocipede, a French invention, two models of which concluded the meeting in a race against each other. This forerunner of the modern bicycle created great interest for a time, much as the safety bicycle did later, but it eventually sunk into obscurity. If any of the spectators at the meeting who witnessed this exhibition of the velocipede could have looked into the future twenty-five years and prophesied the bicycle, with another quarter of a century producing the motorcycle, automobile and airplane, he would have been deemed a fit subject for the insane asylum.

The late Michael C. Murphy, in his book, "Athletic Training," published by Charles Scribner & Sons, New York, wrote: "The crouching start was introduced by me. This was in 1887, at Yale, and Charles H. Sherrill [now Gen. Charles H. Sherrill, who has attained much prominence in the diplomatic service of the United States] was the athlete who first demonstrated its superiority. When he used it in his first race, he was laughed at, and the starter, thinking that Sherrill did not know how to start, held up the race to give him instructions. Finally, he was made to understand that Sherrill was using a new start. Sherrill immediately demonstrated how superior it was to the old standing start, which it displaced, and now the crouching start is used the world over for sprinters, hurdlers, and even quarter and half-milers."



THE LUNGE THE CROUCH STAND-UP CROUCH THE DAB

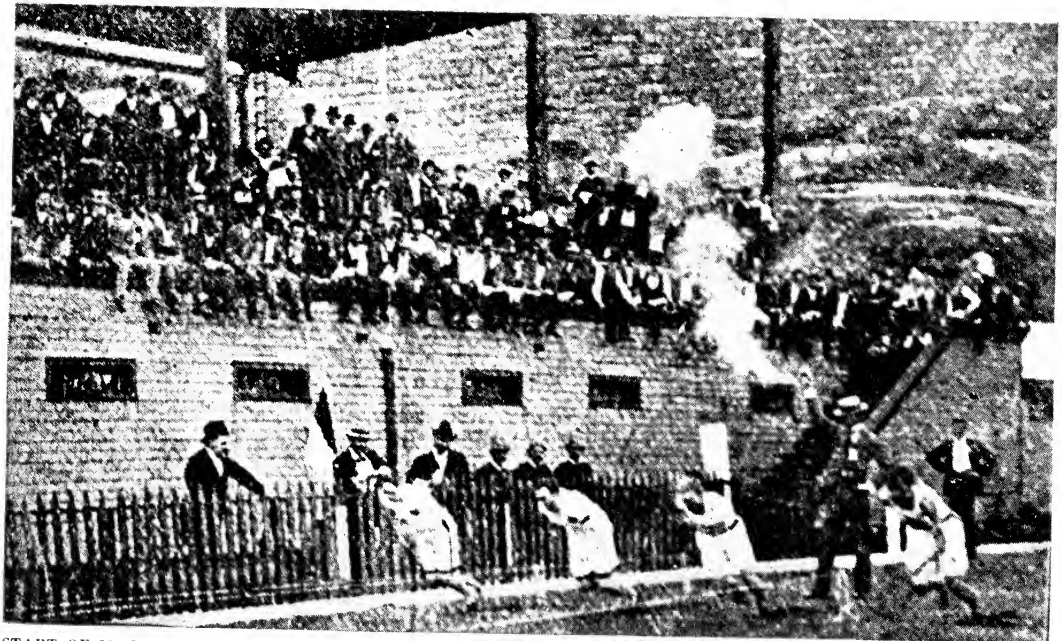
Start of a sprint race in New York in the late '80s or early '90s, when the crouch start was beginning to be used by the younger generation of runners. See further comment on opposite page.

The illustration of a footrace, shown on opposite page, might very well have been specially posed if it had been desired to present the various methods of starting in vogue up to and including the period of the introduction of the present universal "crouch." From left to right, the styles illustrated are as follows: The "Lunge," the "Crouch," "Standup Crouch," the "Dab."

The "Lunge" was a sort of hit-or-miss method of getting away from the mark. The runner had no balance and used his arms in an effort to propel himself from the starting line. If the pistol cracked when he was at the limit of his "throw forward" he would be in a position to get off as well as any of his rivals who might be ready, but as a general thing he would have to be lucky.

The "Crouch" is the last word in footrace starting. This is now the style used the world over by amateurs and professionals alike. When perfected, it makes for an absolute getaway. It has many variations, the principal phase of any of which make for a sureness of being able to stay on the mark and getting away with the report of the starter's pistol. The illustration, which was taken in the early days of the crouch, shows the hand poise and body support to be as they should be.

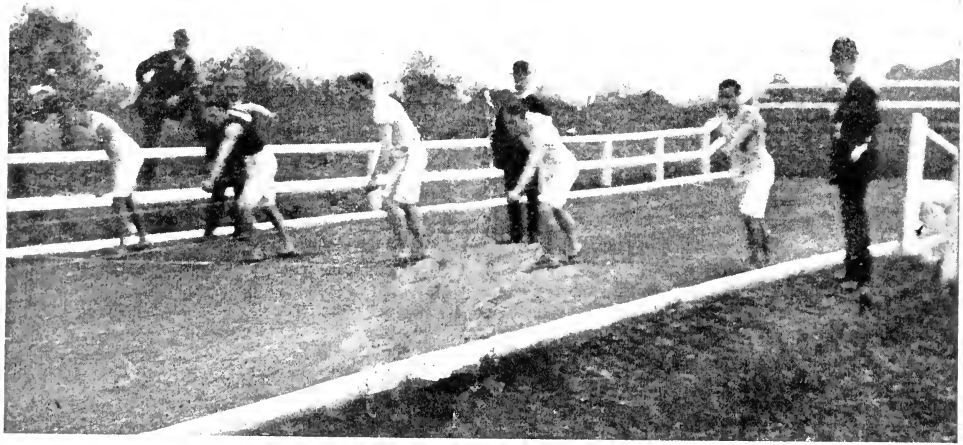
The "Standup Crouch," the old "pro" method, was in vogue before the coming of the present crouch. This demanded the first movement out of the holes to be made with the rear foot. The front foot was directly on the line and flat, the leg being used as a prop. A tremendous pushaway was had with the rear leg and, altogether, when used properly, it was good for a yard or more over the "dab," which was in almost general use at the same time.



START OF 100 YARDS RUN, INTERNATIONAL DUAL MEET NEW YORK ATHLETIC CLUB vs. LONDON ATHLETIC CLUB, MANHATTAN FIELD, NEW YORK CITY, SEPTEMBER 21, 1895. WON BY B. J. WEFERS, NEW YORK ATHLETIC CLUB; TIME 9 4-5 SECONDS, EQUALING WORLD'S RECORD OF JOHN OWEN, JR., MADE AT NATIONAL A.A.U. CHAMPIONSHIPS OF 1890.

From left to right: H. G. Stevenson (London A.C.), C. A. Bradley (London A.C.), John V. Crum (New York A.C.), B. J. Wefers (New York A.C.).

The "Dab" was the universally used standup style of starting before the introduction of the crouch. This was the style used which necessitated a sort of pecking movement with the front foot when the runner had been too long or was inclined to be extremely nervous on the mark. While a forward action, it was not a positive one; with the result that with its follow-up, the movement with the rear leg, it would net no more distance forward than that accomplished with one movement with the aid of the standup crouch, or the run out of the hole as now used with the aid of the present crouch.



Start of the 100 yards run at the A.A.U. championships, Analostan Island, Washington, D. C., October 11, 1890, when John Owen, Jr., of the Detroit Athletic Club, made his record of 9 4-5 seconds, being the first amateur in the world to accomplish that feat. Owen was trained for this race by the late Michael C. Murphy, the famous trained, subsequently of Yale, University of Pennsylvania and Olympic championship teams. Note that the runners are all using the standing start, the crouch method not yet having come into vogue.

THE STAND-UP CROUCH START

By Al Copland.

In comparing the present "crouch" style of sprint starting with the old standing-start method, Al Copland, first national champion in the 220 yards low hurdles and holder of the title, 1887-1889, inclusive, has contributed the following interesting article on the subject. As Mr. Copland's competitive career overlapped the period in which the standup start was used and the introduction of the crouch, his remarks have the value of personal experience.

In order to give some idea of the value of the rear leg in the now accepted proper method of starting—the "crouch"—it may be said that part of this scheme was used in the oldtime "standup" start, and that the users of the "dab," a forward movement with the forward foot, were eliminated with splendid results by those who "ran from the rear leg."

This style of starting was little known and rarely used by amateurs when the standup style was in vogue. It was so productive of results by the few who did understand its use, that it was no wonder that many asserted that its exponents were "beating the gun." They could not see what was going on and could not differentiate between the merits of the newer method and the "dab."

The fact was clearly established time and again that the user of the move-from-the-rear-foot style could stand his mark longer and more solidly and get into his running quicker than was the case of users of the "dab."

Finish of the 100 yards run, at Analostan Island, Washington, D. C., when John Owen, Jr., made his famous record of 9 4-5 seconds for the distance. Start of race shown on preceding page.

All this is leading up to the contention that the standup style of former years actually was the present day "crouch" in standing posture.

The "dab" style demanded the placement of the front foot on the scratch line, with the other about at what is found to be an acceptable distance back. When the command to "Get set" was given, it was really a ludicrous sight to see men almost balancing themselves on their toes, with the invariable result—if held for any short space of time—that they either fell over the mark, beat the gun, or got away in only fair shape.

With the "standup crouch" there was never that uncertainty. The runner, as was the case with the user of the "dab," set his forward foot at the scratch line, but with the foot flat, the knees being bent just enough for the leg to be the prop for the body. The rear leg was well set, and the user of the style always ready for the gunfire after the "Get set" command.

The followers of the latter style attained the same results with one move, i.e., the runout of the rear hole, while the users of the "dab" took two moves to cover the same ground—they made the nervous "dab" move which was scarcely of more value than to send them forward less than a foot, following which the rear leg was brought out of the hole.

Charles Paddock; illustrating the "jump" finish—While not recommended as a standard finish style, this type of action works out to splendid advantage when used by Paddock. Several sprint champions have used it, although it is frowned upon by most coaches. (A) Paddock gathering himself on step before his lunge for the tape. (B) Breasting tape with both feet off the ground. The right arm action is forward rather than upward and therefore aids in the preservation of his necessary forward lean.

THE FIRST SPIKED SHOE IN AMERICA

In connection with this book on sprinting, an account of the introduction of the spiked shoe in America is not out of place.

After the organization of the New York Athletic Club, in 1868, the new club naturally wished to hold an athletic meeting and arrangements were made to hold the contests in a building that was under process of construction for a skating rink, at Third Avenue and Sixty-fourth Street. Artificial means of refrigeration were not so advanced in those days as they are at present and nature had to be depended upon to furnish the desired surface. The inner ring was floored with well pounded clay, so as to be waterproof when flooded, and it was just large enough for an eighth of a mile track, with four straight and narrow sides and four uncomfortably sharp corners. The date was November 11, 1868.

Mr. Curtis (see page 187) relates that of all the athletes only one had spiked shoes, which he had obtained while on a visit to London. Nobody knew anything about these newfangled contrivances, but all agreed that if English runners used them they must be good, and they were loaned by the owner to various friends during the course of the evening. Mr. Curtis used the shoes in the 75 yards and 220 yards events, while H. S. Magrane occupied them in the quarter and half miles. The shoes were helpful in winning a prize in every event in which they were used, three firsts, one second and one third being the total for the evening. When it is remembered that not one of the

Champion Paddock breaking record for 100 yards run in 1921 Amateur Athletic Union National Championships at Pasadena, California. Blenkiron, Los Angeles Athletic Club, second; Farrell, New York A. C., third; Kirksey, Olympic A. C., fourth.—In this race Paddock equaled his former mark of 9 3-5 seconds and officially established a new A. A. U. record. It also equals the world's record for this event, which is held jointly by Paddock, Howard Drew and D. J. Kelly. Both Paddock and Drew equaled Kelly's record while representing the University of Southern California. An attempt has been made in this handbook to discriminate between "running" and "sprinting," owing to a widespread belief that the two are identical. The former, however, should be considered a natural method of getting over the ground, whereas "sprinting" in the final analysis is a cultivated mechanical method of propulsion. The short distance man should bear this in mind at all times and should carefully analyze the different leg and arm movements which make up his full action, with a view toward eliminating any portion of it which does not conform to the technic of sprinting. As a matter of fact, this type of high knee action, and abbreviated arm action, is rarely used continuously beyond the 150-yard mark, as the 220 man will inevitably drop into a "stride" action during some portion of the race. Most finish pictures show a wasteful rear leg kick—a partial lack or break in running angle (forward lean)—a lack of effective arm action and an exaggerated foreleg stretch. This championship finish is no exception to the rule. The fundamentals of sprinting are simple and few, and there is no reason why every novice should not "ground" himself in them to an extent that will entirely eliminate any unnecessary action. The experienced sprinter can best rid himself of his "form" faults, by devoting the first month of the season to a careful diagnosis of all the movements which make up his style and then comparing them with the accepted fundamentals of the event. This does not imply that every sprinter, even though he follows the fundamentals, will perform in the same way that others do, for the physical and mental makeup of the individual will always produce numberless variations of form.

users had ever before worn a spiked shoe and that owing to the purpose for which the track was constructed it was almost as hard as a concrete floor, it may be realized that the new style shoes were somewhat uncomfortable, to say the least.

The use of the pistol in starting was not as general as it later became, and a bass drum was used at this meeting to give the starting signal. While it will be generally admitted that such a sound would be audible not only to the starters but even to all of the spectators, yet a contestant in one heat of the 75 yards run asked for another trial because he "did not hear the drum."

REMARKABLE TIMES IN EARLY CONTESTS

As an illustration of how tenaciously the gentlemen of the old school stuck to their opinions Mr. Curtis related the somewhat sensational result of a race at the Elysian Fields, Hoboken, N. J., then the most convenient playground for New York.

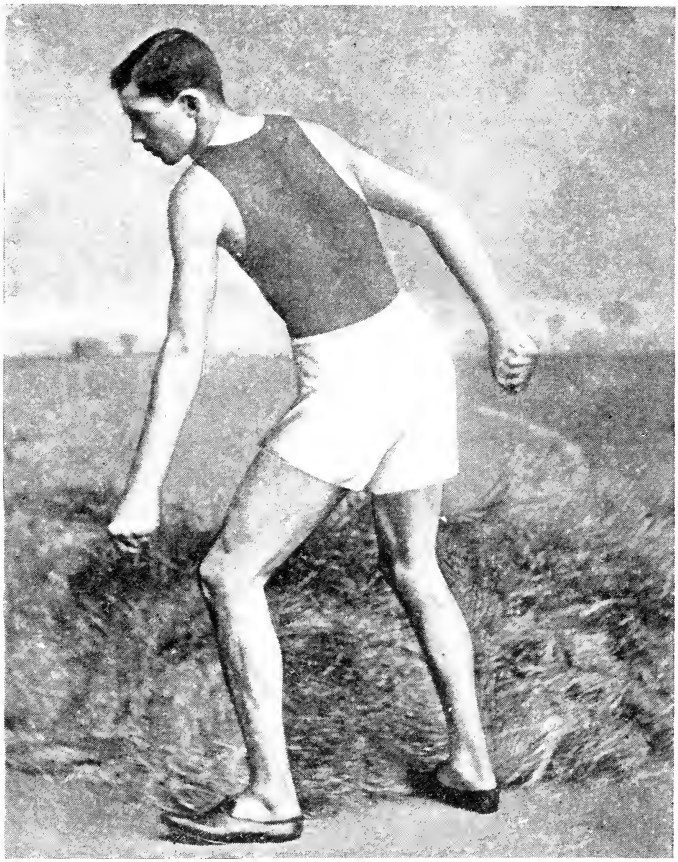
"In a 100 yards handicap for members of the Atlantic Boat Club, July 19, 1868, I won by a yard, and the timekeeper announced 'nine seconds.' In those days a timing watch was regarded with veneration and the man fortunate to own one stood very high among his fellows. The idea of doubting the timekeeping was never entertained, but men were at once stationed on the starting and finishing lines, while a messenger was sent to the boathouse for a 100-foot tapeline and the track most carefully remeasured, with the result that it proved to be only three inches short of 102 yards—5 feet 9 inches longer than it should have been!

"In those days athletes were not so thoroughly informed on times and distances and this performance was accepted for years." Eighteen years later Mr. Curtis met this timekeeper at an athletic meeting in New York City and said to him:

"Now that it is so long ago, don't you think you made a mistake that day you timed me 100 yards in nine seconds?"

Mr. Curtis certainly expected a frank confession of the blunder, but instead received the following equivocal reply:

"Well, William, you was running terribly fast in those days."



LAWRENCE E. MYERS.

America's greatest campaign track athlete, whose remarkable ability was the sensation of three continents.

LAWRENCE E. MYERS.

Certain figures will stand out for all time in various fields of endeavor, their overshadowing personality, in addition to their fame, putting them in the class of immortals. In a volume of this kind, therefore, it is a fitting place to record the athletic history of this phenomenal runner, not alone as a tribute to his personal prowess and as a matter of historical interest, but also as an example of what one man may accomplish by a perfect co-ordination of all his mental and physical abilities.

In this category must be included "Lon" Myers, whose feats on the cinderpath made him the most prominent runner in the early days of organized amateur athletics in America. This reputation was enhanced when he visited England and demonstrated to the hitherto unbelievers in the home of footracing that the American times of the numerous races which the young athlete had won were, if anything, too conservative.

Myers, who was born at Richmond, Va., February 16, 1858, was noted among his companions as a runner and jumper, but none suspected the latent ability that he subsequently developed. He made his first appearance on the cinderpath in regular competition at the election day games of the New York Athletic Club, November, 1878, when he won the quarter-mile handicap with ease.

During the following summer he carried all before him and at the national championship meeting won no less than three championships, the 220, 440 and 880 yards.

Many persons who were supposed authorities on matters athletic could not see how Myers could last another season at such a pace and predicted an early demise if he did not lessen his activities. Myers, however, apparently knew his own powers best and to his friends' warnings replied that he was going to try and alter all American records from 100 yards to one mile.

His confidence in himself was well placed. Record after record went down before him. At the national championships of 1880 he ran seven times in one day and won the 100, 220, 440 and 880 yards

J. A. LeConey, Lafayette, winning the 100-yards run at Penn Relay Games—His final off-the-track position has principally been caused by the final spasmodic effort rather than to a premeditated desire to use the "jump" style. It may or may not be the desirable thing. At all events the head and upper body should incline forward rather than to the rear.

championships. The following week he competed in the Canadian championships at Montreal and repeated his victories in the same events, thus winning eight national championships in one year, a feat that has never since been duplicated.

Running in the colors of the old Manhattan Athletic Club of New York, whose emblem, the "Cherry Diamond," was carried by many famous athletes of the decade of the '80s, Myers' performances brought much prestige to that organization. In 1881 his club determined to send him to England, where doubt had been expressed—and reasonably so—that any human being could perform all of the feats that had been attributed to the American meteor.

It did not take the American long to become acclimated and his practise spins were enough to demonstrate to those who had seen him in training that if ever there was a super-runner, here was one.

Myers won his first race, a quarter mile, by eleven yards in 49 4-5 seconds, beating all English records. A week later he covered the same distance in 48 seconds, twenty yards ahead of the second man, and at the English championships the week following he set the record for the half at 1:56, which stood for years.

Such remarkable performances had never been shown before by either amateur or professional and Myers was immediately proclaimed the best runner ever seen.

The expert of the Manchester Athletic News in commenting upon one of Myers' races in England, said: "There was never a man more naturally cut out for running than L. E. Myers. He is narrow chested and next to no weight above the hips, but his style of going, the way in which he puts his foot down, is, without doubt, the most perfect action I ever saw exhibited by any athlete. His style is just the same whether he is going fast or slow and the manner in which he managed to cut down his twenty-two opponents in the half mile was simply superb."

Myers made two other visits to England, in 1884 and 1885, defeating the swiftest runners there. From 1879 to 1885 Myers held each year a championship at one distance or another, and in some years held several.

On Myers' return from England in 1885, the Manhattan Athletic Club arranged a benefit meeting in Madison Square Garden. The

Finish of the 220-yards run, Intercollegiate championships; J. A. LeConey, Lafayette, first; E. Sudden, Stanford, second; F. K. Lovejoy, Cornell, third; M. M. Kirksey, Stanford, fourth; S. Feldman, Yale, fifth—All of the contestants show a general lack of arm action. The winner has a slight touch of neck tension and an excess of oblique arm action has twisted him slightly off center. The Cornell sprinter is using a fine stride action, save for a slight head fault. This stride style is not properly a finish action. He is using a well developed natural style, with a full foreleg stretch and an equally full arm-swing. He is not kicking up behind and his body position indicates that he is depending largely upon his hip action for his stride length. The exaggerated shoulder-swing fits in well with his particular style but is not usually recommended, as it will throw a less powerful runner off balance. The sprinter on the extreme right is depending entirely upon his arms. Note that the Cornell runner is holding a fair body lean in spite of his full length stride. Few sprinters are able to do this, and as a result are constantly forced to pull themselves ahead by sheer strength, when attention to the center of gravity would greatly decrease this effort

affair attracted such a large entry that the one mile handicap race had to be run in heats. Some athletic authorities held that the acceptance of money from the meeting—the definition of what constitutes an amateur had not been as yet so clearly defined—would make the runner a professional, but before the question was settled, Myers came out openly and accepted the challenge of W. G. George, the noted English runner, for a series of three races, for money, in the spring of 1886.

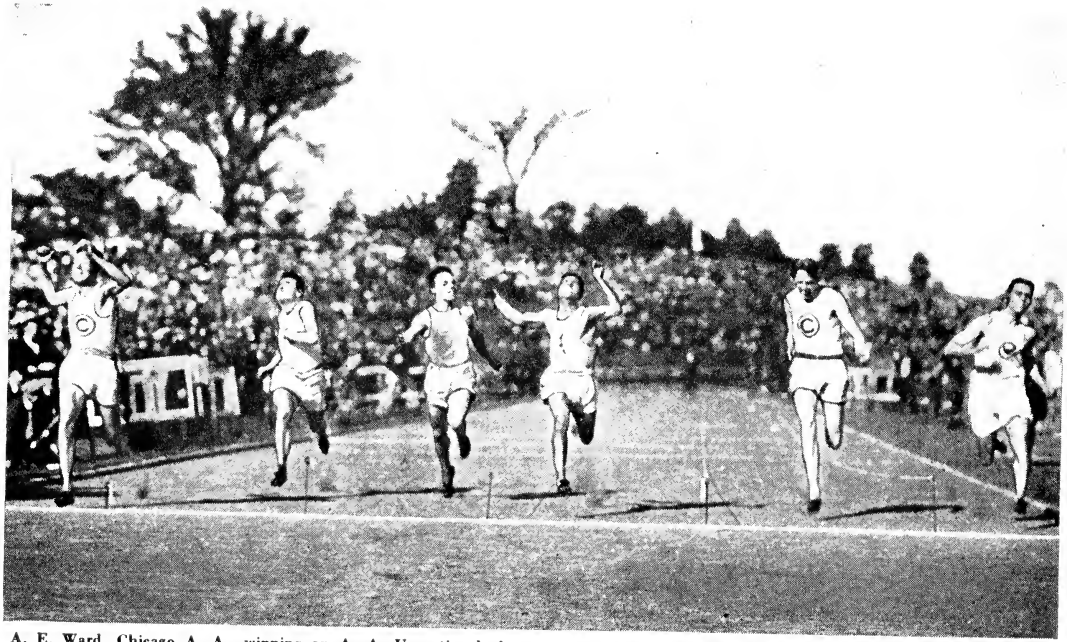
The events, at a half, three-quarters and one mile, were held in Madison Square Garden, in May, 1886, and Myers won all three. His victory in the long race was especially creditable, as the Englishman in August of the same year established a world's record of 4 minutes 12 3-4 seconds for the distance, which still stands as a professional record. Myers previously had run George, while both were amateurs, at the old Polo Grounds, Fifth Avenue and 110th Street, New York, in 1882. Of three races, Myers won the half mile, while George captured the 1,320 yards and the one mile. They met again in the professional arena, in Australia, in 1887, where Myers had journeyed with Harry Fredericks, another famous runner of the period, who had had been a club-mate of Myers. Myers won the 100 yards and 1,500 yards events.

During the time Myers competed as an amateur he won fourteen American, ten Canadian and three English championships. His victories in other competitions were innumerable.

Some idea of Myers' versatility may be gathered by a glance at the records he established both here and abroad from 1880 to 1885. These were accomplished over a variety of distances, both on the flat and over low obstacles. No man before his time or since has ever shown such marvelous all round foot-racing ability, and while nearly all of the records he established have gone by the board, there appears little likelihood that his equal will ever be seen again.

The marks which Myers made as an amateur are appended:

50 yards—5 1-2 seconds; December 12, 1884, at New York.
75 yards—7 3-4 seconds; January 31, 1881, at New York.
100 yards—10 seconds; September 18, 1880, at New York.
120 yards—12 seconds; May 30, 1882, at New York.
200 yards—20 1-8 seconds; September 15, 1881, at New York.



A. E. Ward, Chicago A. A., winning an A. A. U. national championship. Alvah T. Meyer, Irish-American A. C., second; J. Loomis, Chicago A. A., third; A. B. Kelly, New York A. C., fourth. Another instance of apparent temporary faults on the part of topnotch runners—such as loss of body angle, a tendency on the part of several of the runners to kick up behind, loss of head or body alignment and a lack of proper arm action. The third runner from the left shows right sort of leg action and a correct body lean.

250 yards—26 seconds; June 3, 1882, at New York.
300 yards—31 3-8 seconds; October 22, 1881, at New York.
350 yards—36 4-5 seconds; October 15, 1881, at Philadelphia.
400 yards—43 5-8 seconds; June 3, 1882, at New York.
440 yards—48 3-5 seconds; July 16, 1881, at Birmingham, Eng.
500 yards—58 seconds; May 29, 1880, at Staten Island, N. Y.
600 yards—1 minute 11 2-5 seconds; July 1, 1882, Polo Grounds, New York.
660 yards—1 minute 22 seconds; July 17, 1880, at New York.
700 yards—1 minute 31 seconds; September 16, 1882, at Brooklyn, N. Y.
800 yards—1 minute 44 2-5 seconds; September 16, 1882, at Brooklyn, N. Y.
842 yards—1 minute 48 3-5 seconds, on grass, July 6, 1885, at London, Eng.
880 yards—1 minute 55 2-5 seconds; July 7, 1884, at Birmingham, Eng.; August 3, 1885, at Blackley, Eng.; October 3, 1885, at New York.
1000 yards—2 minutes 13 seconds; October 8, 1881, at Polo Grounds, New York.
1320 yards—3 minutes 13 seconds; November 30, 1882, at Polo Grounds, New York.
1 mile—4 minutes 27 3-5 seconds; November 11, 1882, at Polo Grounds, New York.
440 yards, 2 foot 6 inch hurdles—1 minute 1 5-8 second; November 1, 1880, at New York.
293 yards, 2 foot 6 inch hurdles—27 7-8 seconds; May 20, 1882, at Staten Island, N. Y.

In the first edition of "How to Sprint" reference was made to Wendell Baker, the noted Harvard runner of Lon Myers' period. Mr. Baker was Intercollegiate A.A.A.A. champion in the 220 yards run in 1884 (22 2-5s.), 1885 (23 3-5s.) and 1886 (22 4-5s.) and quarter-mile champion in 1885 (54 2-5s.). In a handicap run at Beacon Park (Boston) on June 14, 1886, he did the 220 in 22 flat and on July 1, 1886, under the auspices of the Harvard Athletic Association, made a world's record for the quarter of 47 3-4s. Trainer Lathrop of Harvard was the authority for a statement that had not Baker lost one of his running shoes 180 yards from the tape he might have done well under 47 seconds, as he had bettered that mark in training with professional runners on the same track. The

record held good until Maxey Long's 47 seconds for the quarter, made at the old Guttenberg (N.J.) race track on October 4, 1900.

Concerning Lon Myers, Mr. Hugh H. Baxter of the New York Athletic Club (national pole vault champion in 1883-84-85-86; see Mr. Baxter's article on the early days of pole vaulting in the book on "Pole Vaulting" of the Spalding Athletic Library series) contributes the following:

"A club in New Jersey giving a meet advertised a quarter-mile handicap run—all men with a record of 50 seconds or better to be penalized 40 yards behind scratch. As Myers was the only man with a record of 50 seconds or better, this was done to keep him out of the race. It made Myers very angry and he sent in his entry, started from forty yards behind scratch, and won! This would seem almost incredible, but, as a matter of fact, the best of the quarter-milers around New York at that time would have hard work to beat 53 seconds.

"At the old Polo Grounds, 110th Street, New York, Myers ran four quarter miles in four consecutive quarter hours. He made what was considered phenomenally fast time. He was a very badly used up man after the last quarter, as he did not have time to 'breathe out' between the races."

Lon Myers died in New York February 15, 1899, from a relapse following an attack of pneumonia, within a day of his forty-first birthday.

THE TWO GREATEST FIGURES IN AMERICAN AMATEUR ATHLETICS

Two names are indissolubly associated with the organization of amateur athletics in America—William B. Curtis and James E. Sullivan. As a matter of record a short biography of each is appended. That of Mr. Curtis was contributed by Mortimer Bishop of New York, noted official and timer at athletic meets, who was a friend and disciple of "Father Bill," as he was affectionately known in the athletic world.

WILLIAM B. CURTIS.

William B. Curtis was born in Salisbury, Vermont, on January 17, 1837. His father was a local clergyman. William, after some education in a local school, was sent to college at Madison, Indiana, traveling there mostly by stage and canal boat. He frequently stated that when about seventeen or eighteen years of age, while living in Chicago, his life was despaired of, being threatened with tuberculosis. Determining to live, he acquired a boathouse on the Calumet River, where he spent most of his leisure time rowing and canoeing, and kept in the open as much as possible. His ability as as an oarsman and gymnast was well known. He became very proficient in rowing and was a leading amateur oarsman. He was also a gymnast beyond the ordinary, doing not only groundwork on the bars, but became skillful on the rings and trapeze, most unusual at the time for amateurs.

Young Curtis conceived a great desire to enter West Point. His father applied for the appointment, but nothing ever come of it. In the opinion of many qualified to know, a great leader of men was lost to the military service. When the Civil War broke out, Curtis secured a commission as a staff officer and was located mainly in the Middle West. French and mathematics were hobbies with him, and in his spare moments during the war he edited a well known book on higher mathematics.

After the war he returned to Chicago and eventually became the assistant secretary of a fire insurance company. This company was wiped out by the great Chicago fire of 1871. He kept up his rowing and gymnastic work and frequently visited New York, at times just to attend a performance of some opera of which he was very fond.

Mr. Curtis subsequently went to New York and shortly after joined the staff of the "Spirit of the Times" of which he subsequently became managing editor.

His activities in athletics were marked. He helped to form the New York Athletic Club, being one of three men—Harry Buermeyer and John C. Babcock—who were its founders.

On locating in New York he had a parlor floor in a dwelling on the East side of Sixth Avenue between Thirteenth and Fourteenth Streets, where a number of young men interested in athletics met nightly, and where he did considerable gymnastic work. His great harness lift, still a record (3,239 pounds, December 20, 1868) was made here. He practised a long time for the event and when performed, all the weights in the place were added to the pile and had any more dumbbells been about the room the record would have been increased by some pounds.

He imported and wore the first running shoes used in this country, and loaned them to others when not in use by him He also rode a high wheel.

He could do almost anything in athletics except box, and he left this specialty to his intimate friend Harry Buermeyer. He was very fond of walking. In the early days he went out with a lot of New York Athletic Club men on Sunday hikes. Later, the party becoming small, the writer with several others joined him in these tramps, from which was organized the famous "Fresh Air Club," a band of pedestrians who, negotiated the mountains and valleys within a hundred miles of New York, and during the winter season skated on the Hudson River and ponds and lakes in the Metropolitan area.

He never smoked nor drank alcoholic beverages or tea or coffee. During the Civil War his companons urged him to drink or use tobacco if he wanted to escape disease, but he refused to indulge and survived. He was a great water drinker; he called himself a "water drunkard," freqxently drinking a good sized pitcherful at a meal. When he became fifty years of age he tried various drinks to see if he really would like them, but one of each was sufficient.

He was one of the founders of the National Association of Amateur Athletes of America and later was instrumental in forming the Amateur Athletic Union, of which latter body he was a governing spirit until his death.

It was Mr. Curtis' custom when a holiday and Saturday and Sunday came together to take more extended walks. The White Mountains was one of his favorite climbs and it was on such an expedition, in a terrific snowstorm on Mount Washington, July 2, 1900. that Mr. Curtis lost his life. A marker has been placed on the spot where his body was found, within a short distance of a shelter hut. A companion, Allan Ormsbee, a young man of Brooklyn, also lost his life with Mr. Curtis.

JAMES E. SULLIVAN.

James E. Sullivan was born in New York City and educated in the public schools. He entered the publishing house of Frank Leslie in 1878, and after the death of Mr. Leslie continued with Mrs. Leslie, being connected with the business office and editorial departments. In the early '80s he conducted an athletic department in Frank Leslie's "Boys and Girls Weekly," which was the first athletic department ever instituted in a home weekly newspaper, and also contributed articles on athletics to the New York Sun. In 1889 Mr. Sullivan resigned from Mrs. Frank Leslie's publishing house to become business manager and editor of the New York "Sporting Times," and two years later purchased the paper. In 1892 Mr. Sullivan founded the American Sports Publishing Company and was its president continuously until his death in 1914. The pressure of the publishing business eventually compelled Mr. Sullivan to discontinue the "Sporting Times," but he found time to edit and write a number of handbooks on athletic subjects.

Mr. Sullivan started his athletic career in 1887, joining the Pastime Athletic Club in 1878. He continued his athletic carreer up to 1884, during which period he won the all-round championship of the Pastime Athletic Club in 1880 and 1881, including a 25-mile walk, 3-hour run, 1-hour run, running, walking and jumping, and finished second in the Canadian half-mile championship in 1884. In 1885 Mr. Sullivan was elected President of the Pastime Athletic Club and was its delegate to the National Association of Amateur Athletes of America for several years and vice-president of the organization in 1886 and 1887. He was one of the organizers of the Amateur Athletic Union of the United States and was active as a member of the board of governors from its organization until his death. In 1889 Mr. Sullivan was elected secretary of the Amateur Athletic Union and held the office continuously, with the exception of the period 1906-1909, in which years he served as president. He was president of the Metropolitan Association of the Amateur Athletic Union for nearly a quarter of a century and had officiated in some capacity in connection with American amateur championship track and field games during the same period, having also had the distinction of having attended every A.A.U. championship meeting in America since 1887 and officiated at the Intercollegiate A.A.A.A. track and field annual championships as judge or referee, for twenty years.

The extent of Mr. Sullivan's activities was not confined, however, to merely being a perfunctory official at games or in an executive

capacity. He had a genius for organization and almost a prophetic vision of the needs of recreation for the thousands of school children in our large cities, and to his tireless efforts in their behalf is undoubtedly due the magnitude and success of the playground movement and organized recreation in the public schools. It was Mr. Sullivan who suggested to the late Dr. Luther H. Gulick the formation of the Public Schools Athletic League of New York and he was a member of the executive committee and chairman of its games committee. He was one of the organizers of the Outdoor Recreation League of New York and its second president. With Commissioner Charles B. Stover and others, he opened the first public playground and gymnasium in New York City in 1898, and at the time of his death was president of the Public Recreation Commission.

In civic matters Mr. Sullivan held a number of honorary positions, being appointed a member of the Board of Education by Mayor McClellan in 1908 and reappointed by Mayor Gaynor in 1912, for a full term of five years. Mayor Gaynor also appointed Mr. Sullivan a president of the Public Recreation Commission as a member of the special committee to receive President Roosevelt upon his return from Africa in 1909, as a member of a special committee to investigate the Board of City Record, and also as chairman each year of the games committee of the Safe and Sane Fourth of July celebrations inaugurated by the mayor in 1910.

Mr. Sullivan's remarkable capacity for organization and direction of large competitions caused him to be invariably selected by the authorities of the several large expositions held in the United States at various times to direct the athletic activities of such affairs. In such a capacity he served as assistant American director to the Olympic Games of 1900 at Paris; director of the Pan-American Exposition (Buffalo, N.Y.) athletic department in 1901; chief of the department of physical culture at the Louisiana Purchase Exposition, St. Louis, 1904; honorary director of athletics at the Jamestown (Virginia) Exposition, 1907; director of athletics at the Panama-Pacific International Exposition, San Francisco, 1915, the full details of the latter being carried out on the plans decided upon by Mr. Sullivan before his death.

Mr. Sullivan's fame in athletics was international and his appointments to the various Olympic Games as American director were universally recognized as being most fitting and representative. He was appointed by President Roosevelt Commissioner to the special Olympic competitions held under the auspices of the Greek government at Athens in 1906 and decorated by King George I of Greece with the Golden Cross of the Knights of the Royal Order of the

Saviour for his services in connection with the games. In 1908 he was again appointed by President Roosevelt as Special Commissioner to the Olympic Games at London and in 1912 appointed to the same position by President Taft to the Olympic Games at Stockholm, Sweden, receiving a decoration in 1913 from King Gustave of Sweden of Knight of the Royal Order of Wasa and from the Imperial German Olympic Commission the German Olympic decoration of the Golden Eagle, the highest athletic decoration at that time in Germany. In recognition of his services as director of the Olympic Games at the St. Louis Exposition in 1904, the International Olympic Committee presented an Olympic medal to Mr. Sullivan, President McKinley being the only other American thus honored.

Mr. Sullivan was secretary of the American Olympic Committee of 1906, 1908, 1912, and for the Olympic Games of 1916 that had been scheduled for Berlin, but which were never held there, of course. At the International Amateur Athletic Federation Congress, at Berlin in 1913, Mr. Sullivan was elected to the council and made chairman of the rules committee of the world, which adopted a governing code of rules and specifications for implements for Olympic competition and international contests at meetings held at Lyons, France, and Paris in 1914, in which Mr. Sullivan took an active part.

The death of Mr. Sullivan which took place in New York on September 16, 1914, after a few days' illness, occasioned the most profound regret wherever athletics were known, messages of condolence coming from every part of the world. At his funeral a special guard of honor, consisting of champion athletes of the Public Schools Athletic League, led by General George W. Wingate, president of the league, preceded the hearse, while thousands of school children stood at "attention" along the route of the procession from his residence to the church where the services were held.

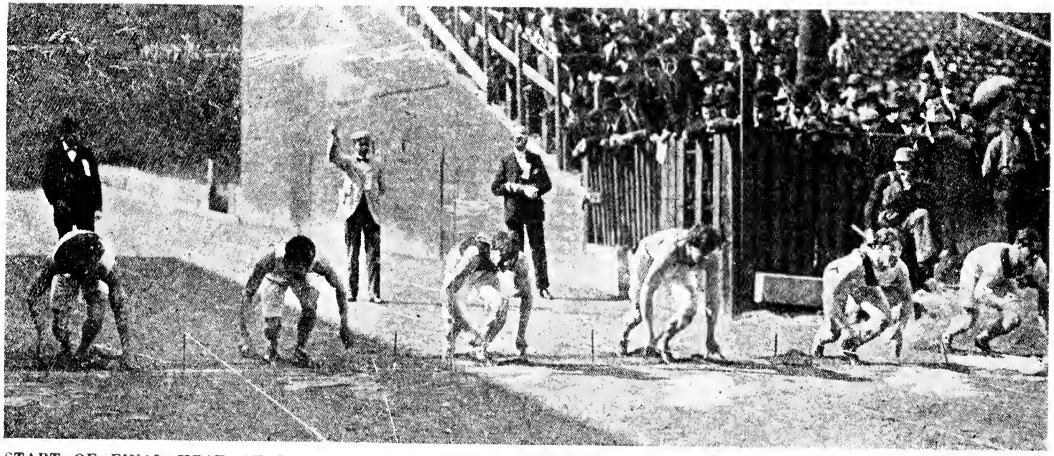
Had Mr. Sullivan lived until America entered the World War, with his organization ability and experience in recreation he undoubtedly would have risen to great heights. Backed by the Army and Navy, with which both bodies of the service he always cooperated, Mr. Sullivan would have stimulated athletic sport of every description to an extent that would have made even its present remarkable growth seem insignificant.

Final of 60 meters dash, 1904 Olympic Ga ies, St. Louis. Won by Archie Hahn, Milwaukee A.C.; W. Hogenson, Chicago A.C., second; F. R. Moulton, Kansas City A.C., third. Time 7 seconds.

IMPORTANCE OF PROPER FOOTWEAR

"SEWING IN THE SPIKES"
Painted from life in Spalding's athletic shoe factory by Leslie Thrasher, the noted artist of "Liberty" magazine covers.

The matter of well made running shoes is a most important factor in sprint competition. The sprinter owes it to himself and the coach owes it to his charges to see that they are correctly equipped. All the routine of training will have been in vain if the competitor fails by reason of foot trouble due to ill fitting, poorly made shoes. Quality of leather, sewing, shape, and, above all, correct placing of spikes, enter into the combination of perfection that champions demand. Novices, especially, should start right. Contrary to the adage, "The beginner should start at the bottom," the opposite is the case in athletic sport—"The beginner should start at the top." The satisfaction of knowing that he has the best is a big incentive to any runner. Undoubtedly many an embryo champion has been lost to the world of sport because he was ill advised in his selection of shoes and the false idea of "good enough for a beginner" served to handicap him unknowingly from the start and eventually quenched all his hopes of ever winning.



START OF FINAL HEAT OF INTERCOLLEGIATE A.A.A.A. 100 YARDS RUN CHAMPIONSHIP, 1896. WON BY B. J. WEFERS, TIME 9 4-5 SECONDS, EQUALING WORLD'S RECORD.

From left to right: Biglow (Harvard), Bowen (Cornell), Patterson (Williams), Wefers (Georgetown), Derr (Princeton), Denholm (Harvard).

This was the second occasion on which Wefers made 9 4-5 seconds for 100 yards, having performed the same feat the previous year in the International dual meet of the New York Athletic Club vs. London Athletic Club at Manhattan Field, New York City. He repeated the performance for the third time at the National A.A.U. championships in 1897.

For the sprinter the shoes should be extra light in weight, with the spikes as long as the stride will permit. The proper shoes for the quarter and up to two miles are a trifle heavier in the bottom, with a little shorter spike than for sprinting. There are exceptions in the case of a lightweight runner, when the use of a sprinting shoe may be preferable.

The cross-country shoe should be equipped with a rubber heel—preferably sponge rubber—so that when the heel is let down at the conclusion of the foot action no jarring sensation will be experienced. Shock deadens the muscles to a marked degree.

No one rule can be applied to everyone, but there is one thing certain: as much attention should be given to the running shoe, if the runner expects to excel, as the shoes worn by a trotting horse, for instance, which are hand-made and fit his gait and hoof to perfection.

Every runner should have two pairs of shoes—and three is not too many—if he expects to compete in more than one event. As we all know, a change of footwear gives great relief to the feet, while in the event of having been wet, a dry pair will be of great assistance.

In the advertising pages will be found a very complete listing of Spalding shoes adapted for track and field competition. These shoes are Spalding made exclusively and represent the accumulated experience of many years of outfitting world's record holders, Olympic, national and collegiate champions and leading contestants with the best and most serviceable footwear for their respective specialties. American Olympic teams are invariably outfitted by A. G. Spalding & Bros.

FINISH OF SEMI-FINAL HEAT OF INTERCOLLEGIATE A.A.A.A. 100 YARDS RUN, 1896. WON BY B. J. WEFERS (GEORGETOWN), TIME 10 SECONDS.

From left to right: Redpath (Harvard), Bowen (Cornell), Wefers (Georgetown), Derr (Princeton), Denholm (Harvard).

KEEPING THE ATHLETE FIT

By

CHARLES PELTON HUTCHINS, M.D.

Williams College—Columbia University
Major Medical Corps, U.S. Army
Director of Physiotherapy General Hospital No. 28
Fort Sheridan, Illinois
Coach Track Teams University of Wisconsin, Syracuse
and Indiana Universities and Dickinson College

INSTRUCTIVE INFORMATION ON GENERAL POINTS OF PRECAUTION IN THE PHYSICAL TREATMENT OF THE ATHLETE IN TRAINING

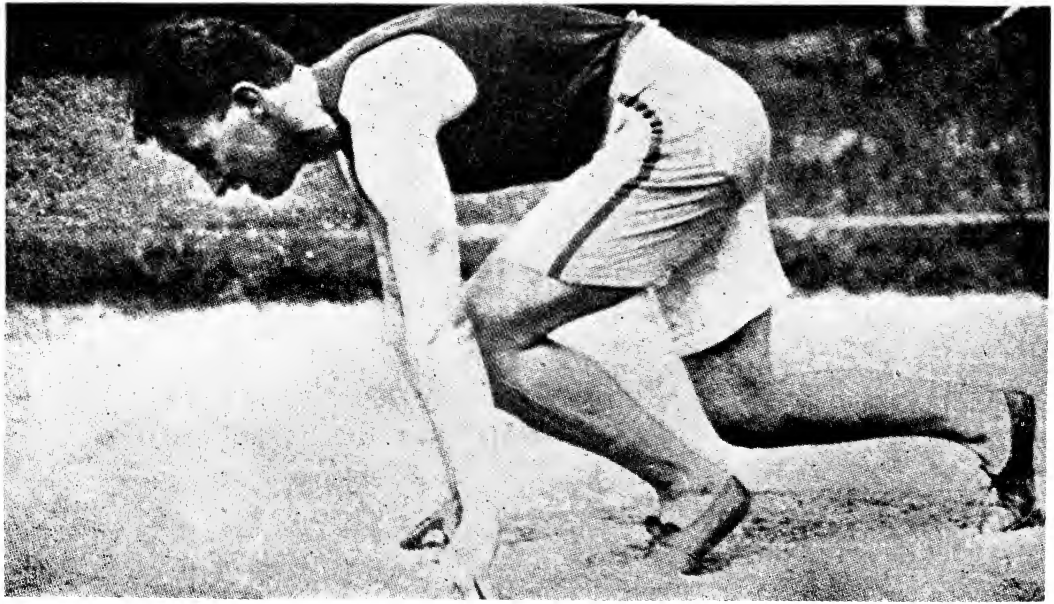
INCLUDING

FIRST AID TREATMENT

For Various Injuries That May Arise in the Course of Track and Field Competition

TOGETHER WITH

Answers to Practical Training Questions by Dr. Hutchins



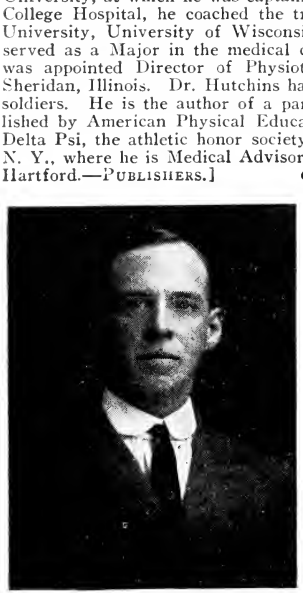
ARTHUR F. DUFFEY (GEORGETOWN UNIVERSITY), THE FIRST RUNNER TO MAKE THE WORLD'S RECORD OF 9 3-5 SECONDS FOR 100 YARDS.

KEEPING THE ATHLETE FIT

By Charles Pelton Hutchins, M.D.

[Dr. Hutchins, the writer of this chapter, is an authority on athletic training and condition, from experience as surgeon to athletic teams as well as that of a coach. Following his undergraduate work in Williams College and Columbia University, at which he was captain of the base ball team, and the Long Island College Hospital, he coached the track teams of Dickinson College, Syracuse University, University of Wisconsin and Indiana University. Dr. Hutchins served as a Major in the medical corps of the army and, after the armistice, was appointed Director of Physiotherapy at General Hospital No. 28, Fort Sheridan, Illinois. Dr. Hutchins had remarkable success in reclaiming disabled soldiers. He is the author of a pamphlet, "Spike Soreness in Runners," published by American Physical Education Review, and is the founder of Sigma Delta Psi, the athletic honor society. Dr. Hutchins is a resident of Syracuse, N. Y., where he is Medical Advisor of the Aetna Life Insurance Company, of Hartford.—Publishers.]

Copyright, 1925, by American Sports Publishing Company.



Charles Pelton Hutchins, M.D.

All human activity is potential for accidental injury. Athletic participation, as exercise or competition, is no more exempt than industry or travel. It is prudent, therefore, in one, as in the other, to prepare and exercise reasonable precautions against the results of exposure and accident, until reference may be made to the physician. For first aid is no substitute for medical guidance; it merely renders conditions more favorable for the physician's achievement. From many years of experience in the supervision of student health and activities the writer has found the emergency suggestions here outlined to aid the subsequent ministrations of the physician.

Warm up slowly before all athletic work.

Avoidance of injury.

Track and field competition does not require the paraphernalia incident to other sports for the protection of the face, hands and bony prominences. Previously weakened joints, such as the wrist, knee and ankle, are best supported by the wrist-strap and the woven elastic section of stocking. Prevention of injury, by learning how to fall and throw and when to relax, helps to eliminate chance.

Time is well spent in the early season to instruct athletes in the technique of "finish" as practised by gymnasts to avoid spills and bad position in landing in the pits. Without muscular support ligaments are unable to hold joints. Vaulters and jumpers especially must keep muscles in control until they have landed.

Staleness (nervous overwork).

"Condition" is mental and physical fitness for the event. Attitude toward the work, enthusiasm through the "grind," triumph over mistakes, improvement in trial performances, full recuperation between daily workouts conserve nervous energy and indicate increasing ntness for the approaching contest. Danger signals of overtraining are loss of sleep, fretfulness, lassitude, overanxiety, indifference, lack of concentration.

Training Emergency Bag should contain:

Nurses' pocket case, dressing scissors (flat point), packets Handifold gauze (sterilized, sealed), adhesive plaster (1 inch and 1 1-2 inch spools), safety pins, roller bandages, gauze (1 inch and 2 inch), absorbent cotton, unbleached

muslin (1 yard square), paper drinking cups, sponge (for washing faces and spattering cold water), tincture iodine, 3 per cent (3 ounce vial), wooden toothpicks, aromatic spirits of ammonia, crown smelling salts, corn and bunion plasters.

Additional supplies useful in quarters:

Hot water bag, ice bag, talcum powder and cocoa butter (for rubbing), Germicidal soap (Parke, Davis & Co.), Spalding's "Mike Murphy Liniment," and a rubdown solution meet every requirement for stimulating massage.

Massage and rubbing.

1. Preliminary to workout. To loosen up muscles, their sheaths and interlying tissues carrying the blood vessels, massage, to slightly increase local temperature, should consist in a moderate stroking of the surface and a rolling between the open hands of the muscles treated. Start from the extremities and proceed toward the body.

2. Following vigorous exercise. Massage removes waste products left by athletic effort. It relieves fatigue by removing waste products and guards against muscle stiffness. Now massage must stretch the muscles that have been exercised, by slow, deep squeezing and stroking combined, as in rolling putty to soften it.

3. For treatment of injured parts. Treatment manipulation depends on the effect to be secured. Manipulation of injured tissues should not be undertaken by inexperienced operators. Light stroking with tips of fingers is sedative and relaxing; grasping, kneading and deep stroking is stimulating.

General points in rubbing:

1. Athlete completely relaxed.
2. Avoid tickling; it contracts muscles.
3. Finger points and knuckles should not be felt.
4. The heavier the muscle masses, the deeper the pressure.
5. Always work toward body.
6. Begin gently and end gradually.
7. Make manipulations elastic.
8. Do not pull skin in opposite directions.
9. Use unirritating "rubs" to avoid friction.
10. Never slap.

AUTHOR'S NOTE—

Physiotherapy—Treatment by the application of physical measures is destined to play the eminent role in assuaging the results of injury and in hastening the return of athletes to competition. The principles and technique developed from experience with war injuries, is broadening and disseminating in service to industrial workers. As this edition goes to press its potency to surmount athletic disability is being presented to the medical profession.

FIRST AID TREATMENT

The directions given in this article are for first aid treatment, where services of a doctor cannot be immediately obtained. In case of injury or accident, no matter how apparently trivial, no time should be lost in obtaining the services of a competent physician.

Sprains.

Put sprained joint at rest immediately with snug roller bandage to restrain swelling. Follow with cold packs with the part elevated (removing the bandage). When tendency to swell has passed, heat, and slow, firm massage,

followed by strapping with adhesive plaster prevents recurrence, permits moderate use, which hastens repair.

Heat—moist or dry. Heat is heat, by whatever method. Moist heat is used locally for a brief period. A bath towel dipped in hot water, wrung out *with the hands*, encloses the injured part while another is being prepared. Continue the process for ten or fifteen minutes. Do not press it down.

Dry heat is for prolonged action, as by the hot air or electric light apparatus or hot water bag. A hot water bag should have a flannel cover, if possible, or a piece of flannel between bag and skin, to avoid burning.

Cold is applied to prevent swelling, thereby relieving pain; to relieve inflammation; to arrest bleeding by contraction of blood vessels; also as a stimulant when splashed, on face or abdomen. Cloths wrung out in cold water or an ice bag, are the methods most frequently employed. An ice bag is more comfortable if a thin layer of flannel is placed between the bag and the part of the body to which it is applied.

Bruises.

If injury is severe, place patient at rest and elevate injured part until doctor's services are secured. Cover injury with several layers of gauze or cotton wet well with cold water; then bandage tightly. When available, use ice bag. Roller bandages must not encircle fleshy part of muscles while athletes are working. Heat is to replace cold application the day following.

Should there be no roller bandages convenient, cut a piece of muslin or cheesecloth into lengths of at least two

yards and from one to two inches wide, and roll tightly for easier manipulation when applying to injury. Begin by applying free end to the part to be bandaged and wind smoothly and uniformly, but not so tightly as to interfere with circulation. The simplest form of bandage is the "spiral," wound same as a puttee is wound around the leg.

Wounds that bleed—abrasions, cuts, punctures.

Cut clothing clear from wounds. Apply 3 per cent alcoholic iodine into wound freely to the full depth of the wound with cotton twisted around toothpick; then apply dry, sterile gauze (Handifold packets) to wound, and bandage it. *Do not otherwise cleanse wound.* A clean wound will heal under its own powers. Wounds that show inflammation must be sent to the surgeon. Prevention of infection by prompt and efficient first aid is, however, the rational treatment.

Severe bleeding.

Place patient at rest and elevate injured part. Apply sterile gauze pad large enough to allow pressure *upon, above* and *below* wound. Bandage tightly.

If severe bleeding continues, apply tourniquet to *upper* arm or *upper* leg, *between* wound and heart and *secure doctor's services at once.* Use tourniquet with caution and only after other means have failed to stop bleeding. Tourniquet *must not remain* more than an hour.

While the definition of "tourniquet" is "a surgical instrument for compressing an artery and arresting a hemorrhage," the need for a substitute when "first aid" is re-

quired necessitates the use of the most available article that can be pressed into immediate service, such as a bandage, handkerchief, towel, stocking—whatever can be most quickly obtained—that can be wound around the limb and knotted. A smooth object, such as a stone, roller bandage, or even the knot itself, should be placed over the artery, which runs up the inner side of the upper arm and upper leg.

Nose bleeding.

Maintain patient in upright position with arms elevated. Have him breathe gently through the mouth and not blow nose. If bleeding continues freely, press finger firmly on patient's upper lip close to nose or have him snuff diluted white wine vinegar into nose.

Brush burns.

"Brush burns" always contain foreign particles, as cinders, dirt. These must be carefully removed under aseptic precautions and surface treated as any open wound. When healing, an ointment is the most comfortable dressing. Do not poultice.

Dislocations.

In case of dislocation of any finger except second joint of thumb, grasp finger firmly and pull it gently to replace joint, then place finger in splint, and bandage it, or strap each of the bones entering into the joint with adhesive to the corresponding bone of the next finger; with such support use is better than disuse. In all other cases place dislocated part at rest and promptly secure doctor's services.

Fractures.

Make patient comfortable and secure doctor's services at once. Avoid unnecessary handling to prevent sharp edges of broken bones tearing artery. If patient must be moved place broken limb in as comfortable position as possible and secure it by splint. Pieces of cross sticks make serviceable supports and are always within reach.

In case of severe bleeding apply sterile gauze and follow directions under "Severe bleeding."

Blisters.

Protect from pressure by bunion plasters encircling the blister, held more firmly in place by a strip of adhesive plaster. If blister breaks, paint raw surface with iodine 3 per cent and when that dries apply boracic acid powder or scarlet red ointment in the hole of the bunion plaster to keep out perspiration as well as infection.

Tender and perspiring feet.

Athletes should give more attention to the cleanliness of the feet than to any other part of the body, particularly between the toes. If they perspire or blister easily, they should be bathed every night before retiring with a solution of baking soda, two teaspoonfuls to warm water, one quart, and should be dried with a soft towel by patting rather than by rubbing.

Ingrown toenail.

A surgical condition tending to become chronic unless properly treated by surgeon. The only lay treatment per-

missible is tincture of iodine 3 per cent deep into the open sore.

Stone bruise.

This is a bruise of tissues underlying the skin, largely the membrane covering the bone. It should be treated at first by cold applications, followed after twenty-four hours by heat, and must be protected from pressure for some time in order to recover. Pressure may be prevented by circular dressings such as a bunion plaster covered by an adhesive strip.

Corns and calluses.

Neglect of these throws the athlete out of line by favoring the foot and interferes with his performance. Paint with 10 per cent salicylic acid in flexible collodion; remove next night, soak foot in hot water and scrape dead skin away with blade of scissors. Repeat daily until good skin is reached.

Muscle and tendon injuries.

Skilled examination is imperative, for on extent of damage depends the treatment. Put at rest at once. If no tear or blood clot occurs, treat as contusion.

Muscle cramp is a spasm. Steadily, and with as much force as is necessary, stretch the muscle by bending part on which it acts; then grasp and squeeze the "belly" of the muscle.

"Pulled tendon" is an injury to muscle proper. "Slipped tendon" and inflammation of sheaths result from overstrain, especially at wrist and ankle. Rest and support

after inflammation subsides is followed by heat and gentle massage. Recovery is very slow; weakness persisting.

Wrench of knee.

Serious complications are: (a) dislocated cartilage, recognized by immediate "locking," if displacement exists and leg cannot be straightened; if full flexion of leg followed by extension without force, does not reduce it, await the doctor; (b) water on knee occurs sometimes as a second stage of synovitis. It calls for medical attention. In fact, any knee injury causing disability for an hour should be referred to a doctor.

Gym itch.

"Gym itch," a parasitic disease of the genital region from contamination from supporters. All athletic clothing should be kept clean and sterilized by steam in the laundry. The itch is controlled best by rubbing part thoroughly with good lather, rinse and, on retiring at night, paint with standard tincture iodine. Do not repeat within two days.

Spike soreness.

The cause of spike soreness, or "shin splint," is a tearing from the bone of the muscle that bends the toes down; pain is usually felt about four inches above the ankle; at the inner edge of the shin.

Prevention rests in careful training of muscles of lower leg before speed is allowed. Especially necessary for those using spikes for the first time.

Cure: Stop all running; walking is not harmful. Counter-irritation to point of tenderness, sufficient to lightly

blister with mustard or Spanish fly blister. Treat blister surgically.

Black toenail.

Have surgeon trim off with fine scissors, the nail when loosened. Dress as any open wound. Prevention consists in keeping nails trimmed short; in having running shoes laced snugly across instep to avoid crowding big toe into end of shoe.

Boils.

Do not poultice boils. Refer case to doctor for general treatment to avoid successive crops, which might rob the athlete of his entire season.

Weakened foot.

Gradual giving out through weakness or overstrain of muscles that turn the foot inward. The only cure from muscle weakness is by graduated exercises, following the principles laid down by Gosman and Perry* in reclaiming the soldier's foot.

The exercises consist in: (a) slow strong bending of the toes downward over the edge of a plank; (b) with the body weight on the outer edge of the foot flex the front part of the foot inward and toward the heel, giving the foot the appearance of a half-closed hand.

Relaxations between contractions must be slow and complete. Gradually increase exercises each night, stopping short of fatigue.

*Gosman and Perry made exhaustive studies on remedial exercises for the restoration of muscles which preserve the stability of the soldier's foot.

For overstrain, rest from running, with massage of the deep stroking type following hot foot baths, will restore muscle tone.

Foreign bodies in eye.

For ordinary eye irritations flood eye with 4 per cent boric acid solution. Remove only loose particles which can be brushed off gently with absorbent cotton twisted into a taper.

Do not remove foreign bodies stuck in the eye. In that case, and for other eye injuries, drop castor oil freely into eye; apply sterile gauze, bandage loosely and send patient to doctor.

Unconsciousness from fainting.

Send for doctor and lay patient on his abdomen and turn his face to one side. Loosen all tight clothing. Remove false teeth, gum, etc., from mouth. Apply cold to head, warmth to hands and feet. Give no liquids by mouth until patient is fully conscious. Then give teaspoonful of aromatic spirits of ammonia in hot or cold water.

If breathing stops, kneel, straddling patient's thighs, facing his head, and resting your hands on his lowest ribs. Swing forward and *gradually* bring weight of your body upon your hands and thus upon patient's back, then immediately remove pressure by swinging backward. Repeat this movement about twelve times per minute without interruption for hours if necessary, until natural breathing has been started and maintained.

Shock following injury.

In case shock is due to severe bleeding, control it first as directed under "Severe Bleeding" and summon a doctor.

Lay patient flat on back and keep him warm with blankets, hot-water bottles, etc., and provide plenty of fresh air. Let patient inhale smelling salts or aromatic spirits of ammonia. If fully conscious, give patient hot drink or teaspoonful of aromatic spirits of ammonia in hot or cold water.

Heat prostration.

Give patient teaspoonful of aromatic spirits of ammonia in hot or cold water. In case body feels warm, apply cold to it; if necessary, give cold bath. In case body feels cold and clammy, apply heat to it and immediately send for doctor.

Loss of wind.

Results from inability of heart to keep pace with the demand thrown on muscles. When it is accompanied by pallor, cold surface and sweating, the condition of the heart should be investigated. If face preserves a good color, the condition is simply loss of breathing balance. "Pain in the side," so well known to distance runners, is an evidence of marked fatigue. In the absence of heart involvement the athlete must curtail either the speed or length of his workout.

To counteract a cold.

Upon the first appearance of symptoms of a cold the athlete should be given a free cathartic, such as castor oil or salts, put to bed and given one pint of lemonade as hot as can be swallowed, after he is under the covers. He should remain there over night and resume the intake of food by simple, easily digested articles.

PRACTICAL QUESTIONS RELATING TO TRAINING ANSWERED BY DR. HUTCHINS

Question—In case of a small deep spike or rusty nail wound which does not bleed freely, should foot be soaked in hot water and should portion of foot surrounding wound be pressed to clear out dirt, rust or other foreign particles?

Answer—The only proper treatment of a punctured wound as those inflicted by a spike or nail would be to introduce 3 per cent Tincture of Iodine to the full depth of the puncture. No wound of this or any other kind should be probed by anyone but a surgeon and the toothpick well soaked in iodine will penetrate as far as any spike or nail. If wound is tortuous (irregular), inject iodine with an eye-dropper.

Question—How about tight adhesive taping of the foot before competing? How long can such a bandage be left undisturbed without interfering with circulation? For instance, when used in high jumping over long period?

Answer—Tight adhesive strapping of the foot which makes a "figure eight" around the foot and ankle or, in other words, does not pass around the foot or ankle circularly, is of very great aid in cases of over-relaxed ligaments. If these are placed as I have indicated they may be left on during the entire afternoon of competition. However, it is absolutely unwise to place adhesive plaster or bandages completely around any limb to include the belly of muscles. This naturally would not apply to joints, but to prevent any interference with return circulation, any circular bandage around the knee or ankle should be elastic.

Question—What would you recommend for protection of cuts and cracks on hands of pole vaulters and weight throwers?

Answer—Cuts and cracks on the hands of pole vaulters, shot putters, hammer and discus throwers may be protected during com-

petition by flexible collodion, where cumbersome dressings would interfere with grip, but this should be removed immediately afterward and the usual surgical indications met.

Question—What is your opinion of water drinking during competition extending over several hours' time? What would you suggest as the best method of quenching thirst while competing?

Answer—Water drinking should be avoided, even in hot weather. Thirst may be quenched by gargling with water repeatedly, as a result of which but a small amount is ever swallowed, and by thorough mechanical washing of the mouth. I believe that the use of lemons increases the parching sensation. I have never found any objection to the use of chewing gum in athletic competition, as a foreign body in the mouth tends to excite the saliva and maintains moisture. I do not see any reason for advising the use of gum for athletes at any other times, because the excitation of saliva under ordinary conditions simply robs the individual of a secretion that should be present during the mastication of food.

Question—You mention "pulled tendons" and "muscle cramp." How do you identify such muscle trouble?

Answer—My reference to muscle cramp and pulled tendons referred to pathological conditions as result of local injury and has nothing whatever to do with fatigue. Muscle weakness on the other hand is fatigue and the element of recovery in an athlete is simply a question of the time and conditions required to reestablish the balance in his heart action. In field event men one has an opportunity to work on muscle cramp and I believe that I have covered the proper treatment comprehensively in the paragraph "Muscle and Tendon Injuries." Cramped muscle can always be recognized readily as being drawn up into a knot with attending pain and inability to move the part. There is an evident sensation of consternation on the part of the patient also. With a pretty wide experience through a good many years of football injuries of this nature, I have never believed in the efficacy of circular strapping of muscle bellies. Before the over-irritability

of the muscle has been recovered from, there is always a predisposition to recurrence, and rest with the treatment noted under the heading mentioned forms the best redemption.

Question—Should an extremely tired runner, with a tendency to collapse and fall, be allowed to rest, or should he be kept moving with the support of companions? What is the best remedy to settle the stomach?

Answer—Fatigue, as manifest by tendency on the part of the runner to fall or to vomit, can be overcome only by recuperation. It is a fallacy to walk this man around. He should be placed in a comfortable position, stretched out on his back with the head low, and away from noise. He should never be given liquid and the only application that may be used with such cases is the application of heat to the pit of the stomach—hot towels or hot water bags. In fatigue sensation is blunted. Extra care, therefore, should be taken to avoid blistering the skin from continuous, confined heat. Until the heart has opportunity to recover its equilibrium there will be no recuperation from the fatigue.

Question—What would you advise for a nervous headache the day of a meet?

Answer—Nervous headache under approaching competition is a difficult problem, since it is a purely functional disturbance due to over-anxiety. Under such circumstances I believe that the athlete should not be left to himself, but should be in the company of such men as do not suffer from "buck fever." No treatment other than this follows, except that the athlete in this condition should have no nourishment before the competition that calls for any digestive effort, as the same conditions that produce a nervous headache will interrupt digestion.

Question—Do you prefer cocoa butter for protection against cold, prior to training or competition? How about olive oil or other oily preparations?

Answer—Any oily substance protects the skin from exposure to the elements. Any of the oils are messy and, being liquid, run off the body when heated to body temperature. Cocoa butter, on

the other hand, will remain in place and is the preparation of choice, I think, for the exposed parts of the athlete, particularly in cross-country running during the fall season.

Question—Will the soap treatment recommended protect an athlete from boils, body itch, and other parasitic skin troubles contracted by contact with wrestling (landing) mats, rubbing tables, etc.?

Answer—The treatment recommended for gym itch would be valuable for any ring worm. It should *not* be used for boils. Any athlete with a skin irritation should be forbidden the rubbing list, because of the danger of conveying the trouble through the hands of the rubber to other members of the team. No athlete should use the towel of another until the towel has been subjected to live steam. If any athlete with skin irritation is forbidden the rubbing table, there will be little likelihood of contaminating the table. Any communicable disease appearing in a track team should call for a separation of the infected athlete from the rest of the team.

Question—Should mustard plasters or similar irritating devices be employed for strained muscles? Or plasters for the back or kidneys?

Answer—Mustard plasters should never be used for counter-irritation in the early stage of any injury; that is, until after the acute symptoms have subsided and it is advisable to create a profound congestion of the part. With the exception of the condition known as "shin splint," I would urge that no counter-irritation should go to the point of developing a blister. I note that you refer to plasters for the kidneys. This is a common misconception that lameness in the back is referable to the kidneys—*it never is.*

Question—Do you recommend high or low street shoes for athletes with weak ankles? How about bad arches?

Answer—High cut shoes, as leather or elastic anklets, support, but do not cure, weak ankles. Remedy lies in strengthening the muscles of the calf of the leg to support the fragile ligaments. No athlete should wear high heels any more than any woman should. The tendency to throw the weight on the toes from using

the foot at any but a correct angle to the lower leg is contrary to every anatomical consideration. In regard to the inquiry concerning bad arches see paragraph on "Weakened Foot." A lowered arch is simply the result of a weakened foot and is never primary.

Question—Is dry heat preferable to moist in the case of a slight sprain?

Answer—The differentiation between dry heat and moist heat for the purpose of general guidance is difficult. Heat is heat in its effect upon the body. These are both convective heats, as ordinarily obtainable, and they have no penetrating effect beyond the depth of the skin itself and the loose tissues underlying. In general I would say that dry heat is preferable to moist, when there is an accumulation of liquid in the tissues, following swelling, bruises and the like. The use of contrast baths (alternating hot and cold) is a stimulation measure used to shock the nerves, supplying the blood vessels of the part.

Question—For blisters caused by chafing of side or rear of shoe against foot would you approve of the use of adhesive tape to avoid pressure? Do you recommend bunion plasters for all types of blisters?

Answer—I do not approve of allowing adhesive tape to touch the open surface of a broken blister. If tape is placed next to an unbroken blister, the top will be lifted off on the removal of the plaster. My preference for circular bunion or corn plasters (depending on the size of the blister) is that they do not make pressure upon the blister itself but upon the surrounding tissues, and the adhesive plaster does not touch the injured surface but does aid in holding the bunion plaster in place.

Question—Does too much massage prior to competition weaken an athlete?

Answer—Massage prior to competition should be very brief and light in quality, simply to pick up and stimulate the muscles. It should never consume more than five minutes for the legs and perhaps ten minutes for jumpers, vaulters and weight throwers.

The relaxing massage after the competition should be slow, deep, sedative and deliberate, in order to encourage relaxation and to squeeze out from the muscles the fatigue products generated by the work.

Question—In enumerating the contents of "Training Emergency Bag," tincture of iodine is listed. How about hydrogen peroxide and bichloride of mercury?

Answer—Hydrogen peroxide is not used by surgeons to any extent. It is perfectly safe in anybody's hands, in fact, it might be called fool-proof. It is not an efficient germicide. I do not believe that bichloride of mercury should be used by laymen. However, the Germicidal soap, mentioned under "additional supplies useful in quarters," is a perfectly safe preparation in anybody's hands and has as high a germicidal value as the bichloride. The hands of attendants must be as scrupulously clean as instruments or dressings, if the danger of wound or abrasion contamination is to be avoided.

Spalding Pole Vaulting Shoes

Since its introduction, the value of the Spalding "Olympic Championship" Pole Vaulting Shoe No. 14-V—high cut—has been repeatedly demonstrated. It gives stability to the take-off foot without adding extra weight. Like all other Spalding shoes, the leather is of the finest and the fit unequaled.
Made to order only and, if desired, supplied one high and one low cut to the pair.

As a matter of fact, the use of the Spalding No. 14-V shoe need not be confined to pole vaulting, as any high jumper, broad jumper or hurdler who requires additional ankle support will find that the high cut feature will give the necessary security and confidence.

See list of Spalding Athletic Goods Stores on inside front cover of this book.

Spalding "Olympic Championship" Sprint Shoe

No. 2-O

The Shoe of Champions

WORLD'S
OLYMPIC
NATIONAL
COLLEGIATE

The finest competitive sprint shoe made. Extremely light and glove-fitting. Made exclusively by A. G. Spalding & Bros. in their own factory.

For complete list of Spalding Track and Field Shoes and Equipment, see Spalding Catalog. Mailed free.

Spalding "Olympic Championship" Jumping Shoes

In jumping events accurate foot placement is the important factor. The shoe must combine the attributes of speed with the essentials of fit and stability. Spalding "Olympic Championship" Jumping Shoes stand up under the pounding impact of the take-off and enable the athlete to successfully utilize every ounce of momentum.

This shoe may be called a general utility shoe, because it is stout enough to be used in the all-round competition and yet light enough in weight to be employed advantageously in the hurdlers or even in the sprints.

See list of Spalding Athletic Goods Stores on inside front cover of this book.

APR 30 1926

SPALDING *and* SPORTS
SPORTS *and* SPALDING

THE TWO GO NATURALLY TOGETHER.
For *SPALDING ATHLETIC EQUIPMENT*
IS AUTHENTIC.

TENNIS rackets, golf balls and sticks, base ball and foot ball equipment—everything that has to do with sports.

Correct outfits for every sport hobby from croquet to polo.

A. G. Spalding & Bros.

PRINTED IN U.S.A.

LIBRARY OF CONGRESS
0 030 235 677 4